

INFORMATION BOOK

The Lark

and SERIES "ST" MODELS

ILLUSTRATED AND INDEXED
SERVICE INSTRUCTIONS
AND PARTS LIST



LEXINGTON MOTOR COMPANY
CONNERSVILLE, INDIANA, U. S. A.

Subsidiary United States Automotive Corporation

WORKS OF HISTORICA



TO ORIGINAL PURCHASER OF THIS MOTOR VEHICLE:
The Company will extend its standard
warranty, provided by the President and the Secretary upon
receipt of application attached hereto, provided that said
motor vehicle is subject to all the conditions set out herein.

Application for Standard Warranty

LEXINGTON MOTOR COMPANY
Connersville, Indiana, U. S. A.

Condition - I am the Owner and Original Purchaser of

(Model) (Serial Number)

bought from (Name of Dealer or Dealer's Organization)

(Address)

(City) (State)

on (Date)

This motor vehicle was sold to me as new and un-
used and I will thank you to send me Standard War-
ranty covering same, provided that said motor vehicle
is still subject to terms of said Warranty.

Very truly yours,

(Signature of Owner)

(Print Name)

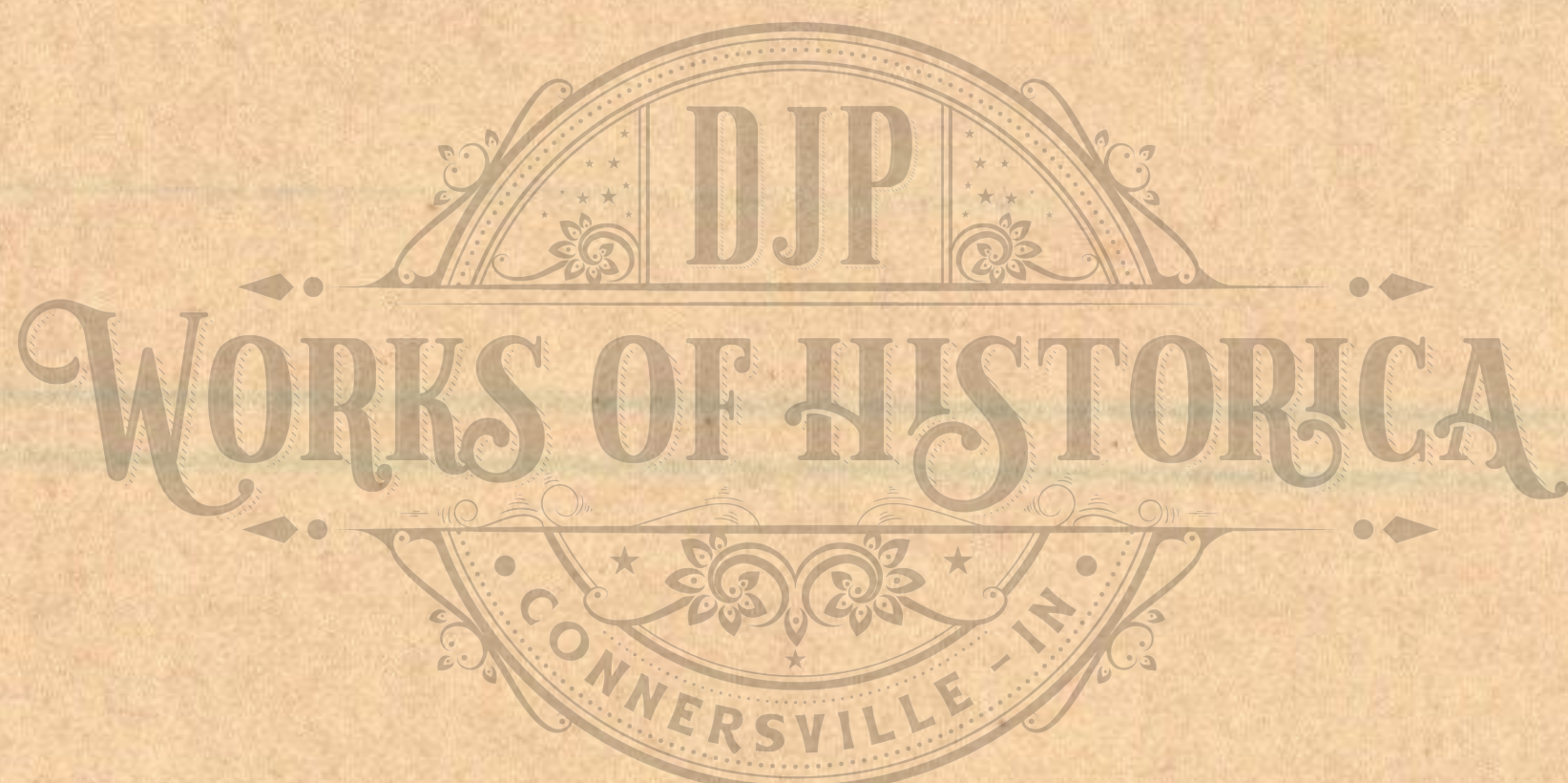
(Address)

Subscribed and sworn to before me by the said

this

day of

(Date)



TO ORIGINAL PURCHASER OF THIS MOTOR VEHICLE:
The Company will forward handsomely engraved Standard
Warranty, executed by the President and the Secretary, upon
receipt of Application attached hereto, provided that said
motor vehicle is subject to all the conditions set out herein.

Application for Standard Warranty

LEXINGTON MOTOR COMPANY
Connersville, Indiana, U. S. A.

Date _____

Gentlemen—I am the Owner and Original Purchaser of
(Model) _____, (Serial Number) _____;
bought from (Name of Dealer, or Dealer's Organization)

(Address) _____

(City) _____ (State) _____

on (Date) _____.

This motor vehicle was sold to me as new and un-
used and I will thank you to send me Standard War-
ranty covering same, provided that said motor vehicle
is still subject to terms of said Warranty.

Very truly yours,

(Signature of Owner)

(Street Address)

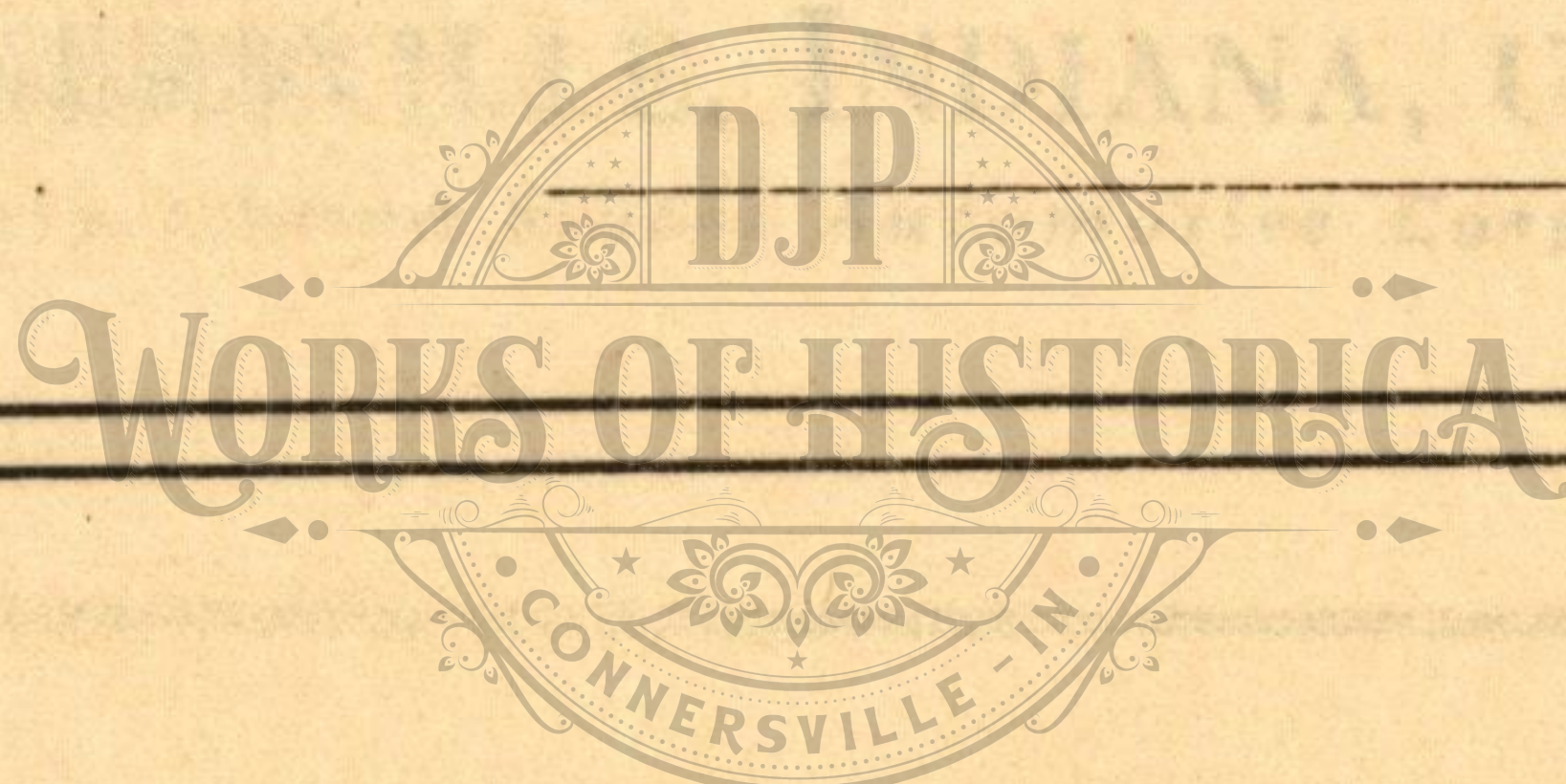
(City and State)

Subscribed and sworn to before me by the said

_____ this _____

day of _____ 19____.

Notary Public



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LEXINGTON MOTOR COMPANY
CONNERSVILLE, INDIANA, U. S. A.
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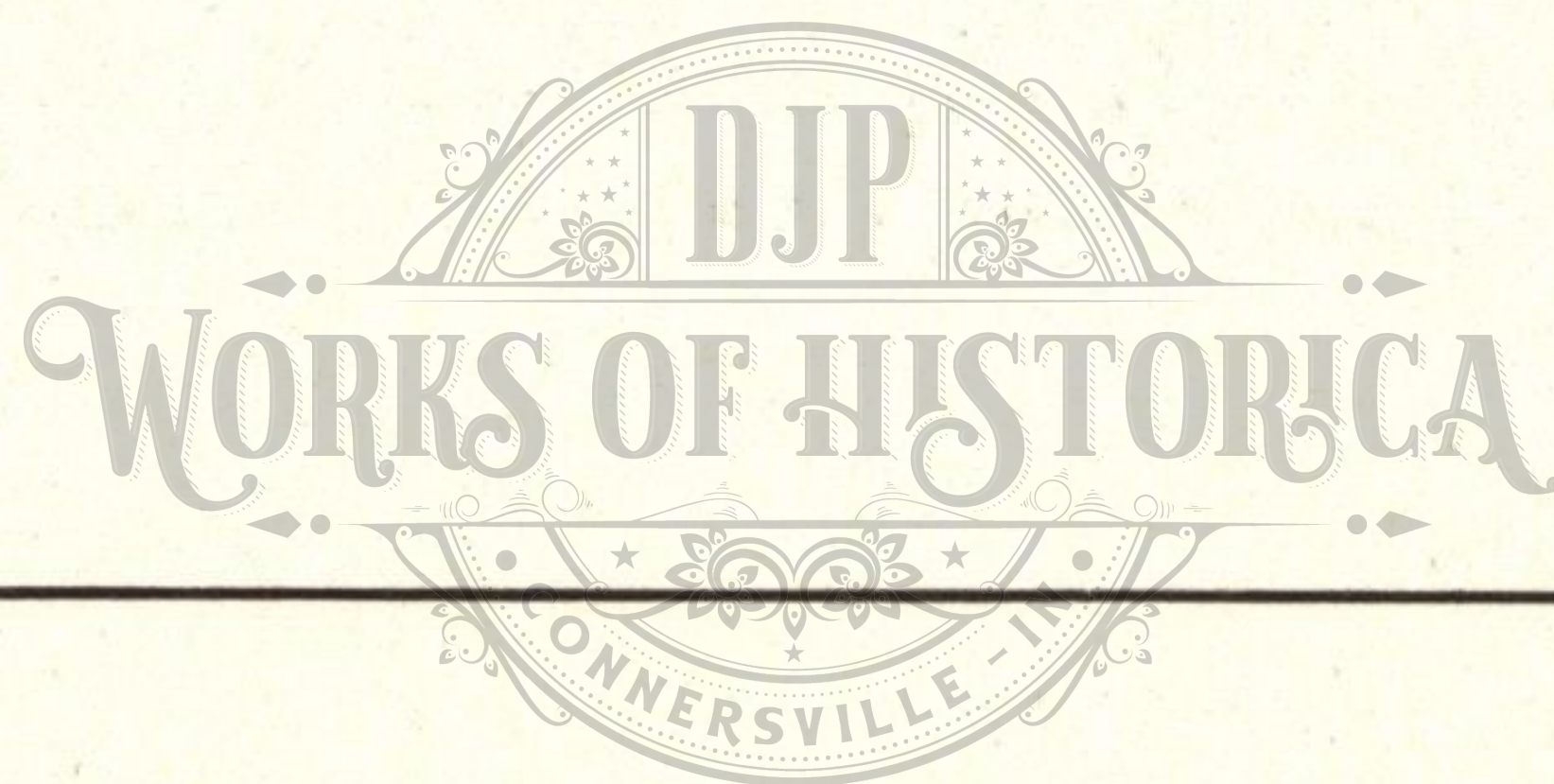
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FOREWORD

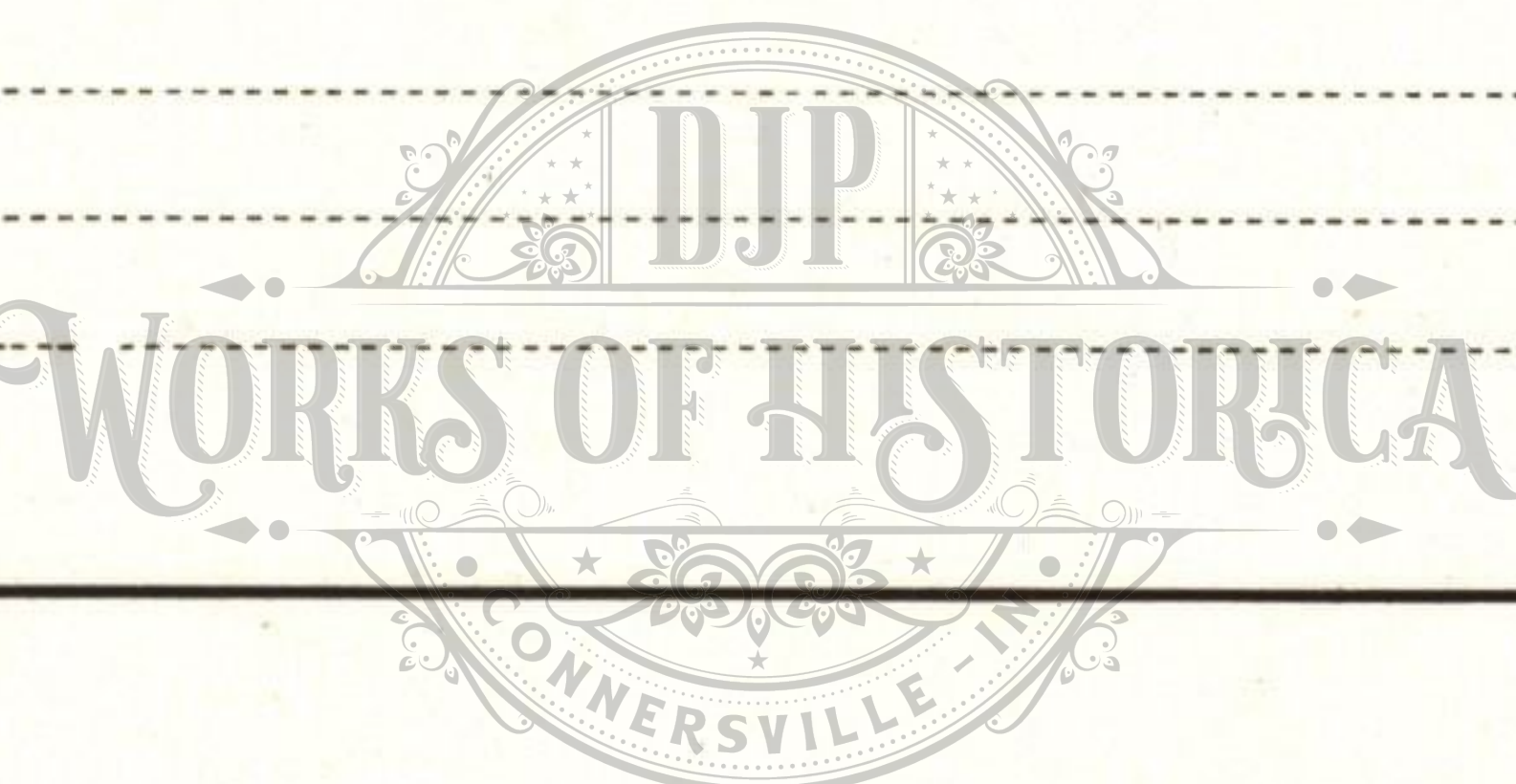
This Lexington Information Book on *the Lark* and other Series "ST" Models has been prepared for the convenience of the car user.

Do not fail to fill out the "Owner's Car Record" sheet as soon as you receive this book or you may fail to receive additional information as it is published.



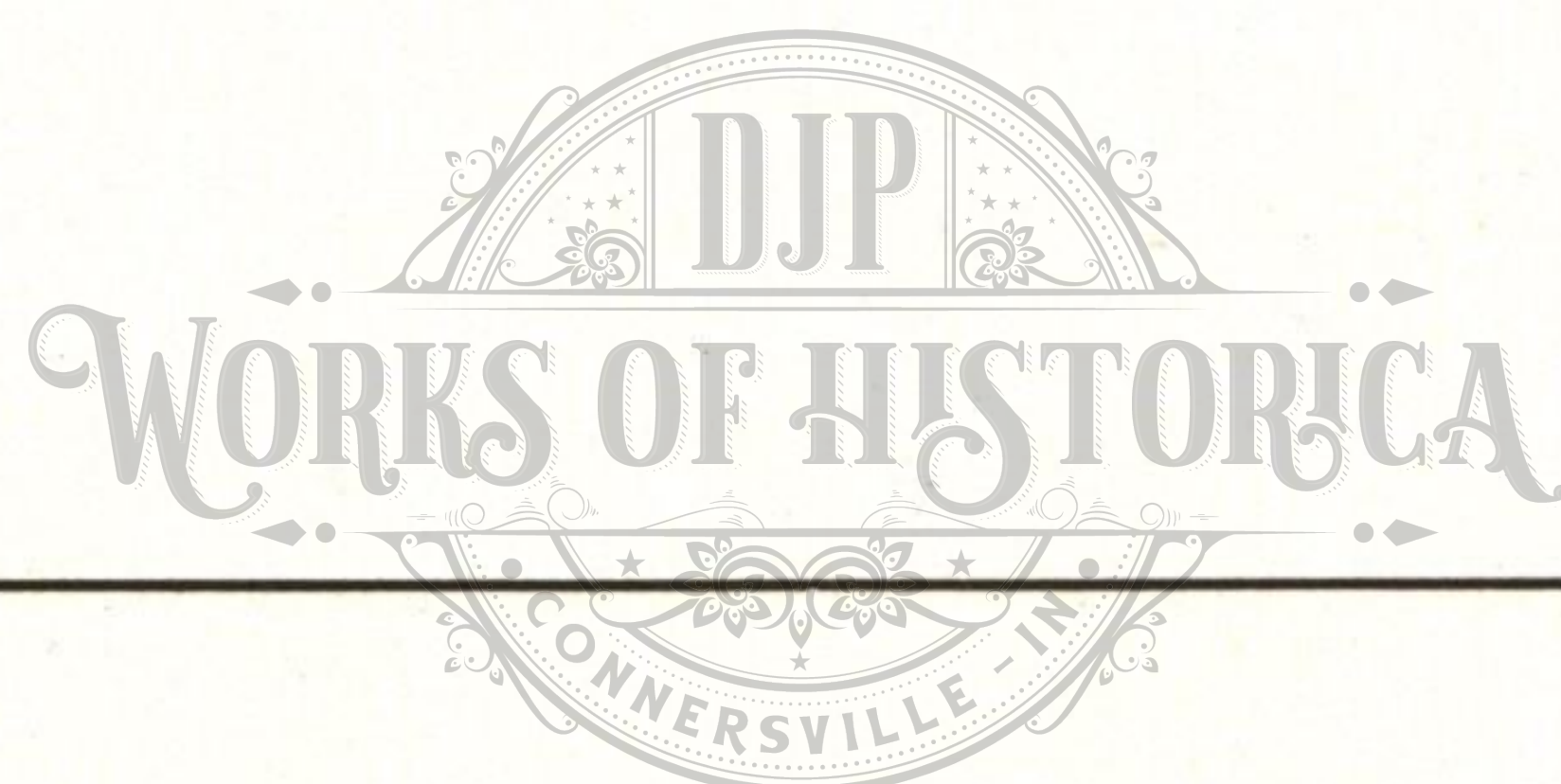
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Standard Warranty

All our motor vehicles are sold under the Standard Warranty below, adopted by the National Automobile Chamber of Commerce, Inc., to which we belong.

The value of a warranty depends not so much upon what it says as upon who says it.

The liberal and fair-minded policy that has been pursued toward Lexington owners since 1908 has descended to us an honorable tradition that must be maintained.

When a customer buys a Lexington our interest in him is not ended—it has just begun.

Lexington owners have always been largely instrumental in selling the product, and if open and just dealing is still appreciated, this noteworthy fact will be as true of Lexington owners in the future as in the past.

We warrant each new motor vehicle manufactured by us to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any parts thereof which shall, within ninety (90) days after delivery of such vehicle to the original purchaser, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been defective; this warranty being expressly in lieu of all other warranties expressed or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our vehicles.

This warranty shall not apply to any vehicle which shall have been repaired or altered outside of our factory in any way so as, in our judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence, or accident.

We make no warranty whatever in respect to tires, rims, ignition apparatus, horns, or other signaling devices, starting devices, generators, batteries, speedometers, or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers.

We reserve the right to modify our motor vehicles at any time without obligation to so modify motor vehicles previously sold.

LEXINGTON MOTOR COMPANY

Under terms of above warranty our obligation ceases ninety (90) days after delivery of vehicle.

To secure credit on parts claimed defective under terms of above warranty, said parts must be returned to factory within thirty days from date of invoice for new part, transportation charges prepaid, for inspection. Credit and refund will cheerfully be made if inspection proves material defective.

Tag all parts returned with model and serial number of car. The serial number can be found on the name plate on the right side of the dash under the hood. It is also stamped on the left front spring horn, on the right rear end of the side rail, and on the upper left side of the crankcase.

Before claiming replacement be sure you have carefully read instruction book and properly taken care of the car as instructed. It may be that the fault is yours.



Speedometer and Vacuum Tank Guaranty

The Stewart-Warner Speedometer Corporation have several hundred service stations and ask you in their instruction book—"not to address your dealer, jobber, or manufacturer—if you do, adjustment will be delayed—write Stewart-Warner direct." Read their instruction book.

Starting Motor and Lighting Generator Guaranty

Gray & Davis, Inc., have several hundred service stations. They are always willing to give you their careful attention, and are well equipped to give efficient service on starting motors and generators. Read Gray & Davis instruction book.

Storage Battery Guaranty

The Willard Storage Battery Company is as liberal. They have over 450 "service stations helping car owners to get lighting and starting satisfaction." They can and will give you better service than is possible for any automobile manufacturer to give. Take your battery troubles to their nearest service station—if they don't satisfy you, take the matter up with their main office at Cleveland, Ohio. Read their instruction book.

Carburetor Guaranty

Every local Rayfield carburetor station has a complete and accurate record of the proper parts best suited for your Lexington car. You are bound to get quicker and better service by asking their help than by taking the matter up with us.

Ignition Guaranty

The Connecticut Telephone and Electric Company have arrangements made with our Dealers whereby repair parts may easily be secured there. If necessary the Dealer will lend you an igniter or a coil while your outfit is being returned to the factory for inspection and repair. This is better service than we are able to give you. Read Connecticut Telephone and Electric Company instruction book.

Claims for Credit or Replacement

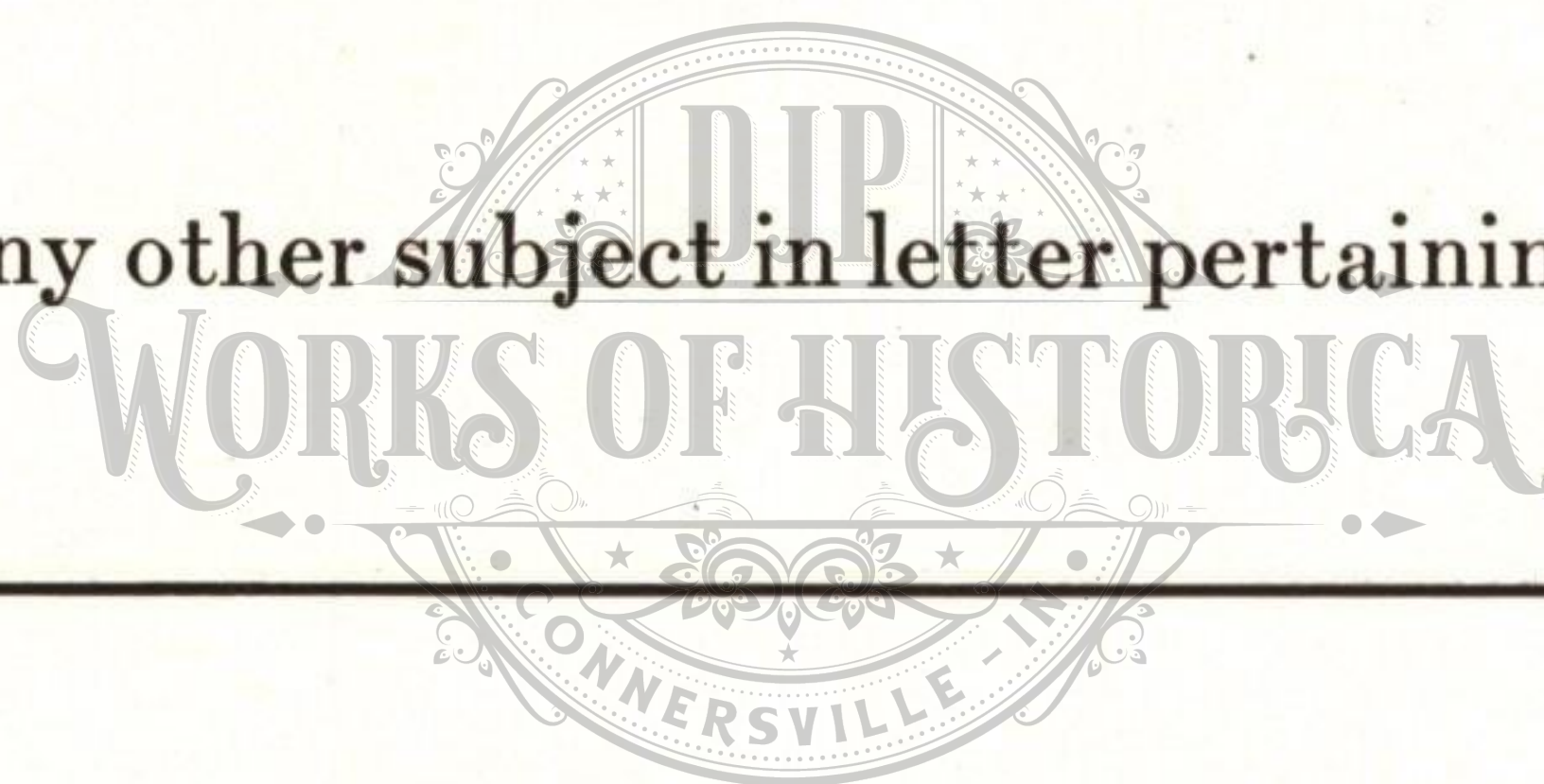
First—Ship parts, charges prepaid, to the Dealer or Distributor, or the same place where the replacing parts were purchased.

Second—Always give invoice number on which new parts were billed.

Third—Be sure that all shipments are properly tagged with shipper's name and address.

Fourth—Each part returned for credit, repair, or replacement must be tagged, describing the nature of the defect, and the serial number of car from which the part was taken.

Fifth—Do not mention any other subject in letter pertaining to claim but claim!



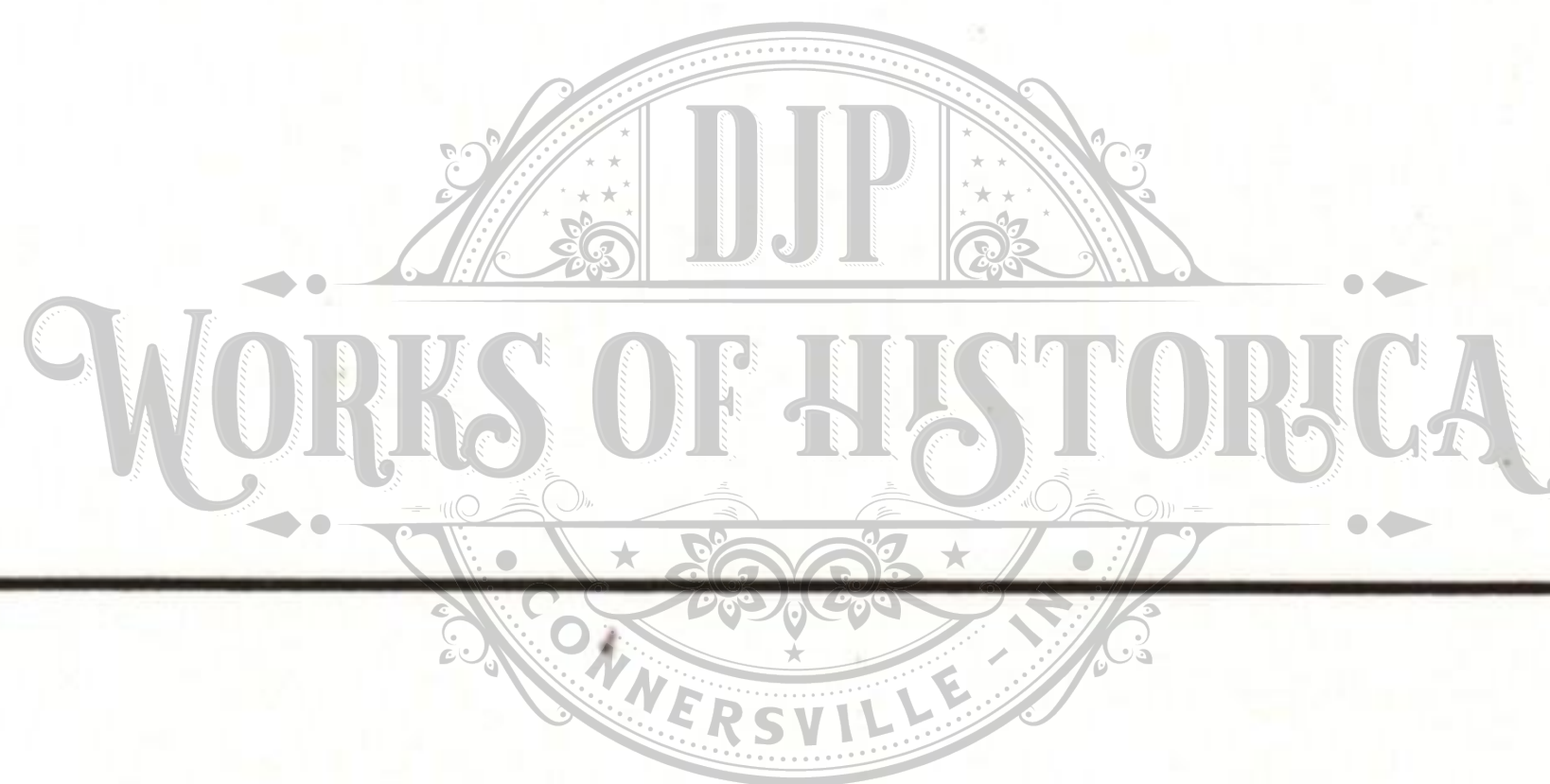
Regarding Return of Parts for Credit

Parts that in the owner's opinion are defective should be returned to the Factory Service Department through the dealer from whom replacing parts were purchased.

But should the replacing parts have been purchased by the owner direct from the factory, the parts considered defective should be returned direct to the Factory Service Department.

In returning parts write to the Factory Service Department giving full information regarding car number, date purchased, also describe conditions under which part was damaged, and enclose with your letter Bill of Lading if parts were shipped by Freight, and give number of Invoice covering new parts used to replace ones removed from car.

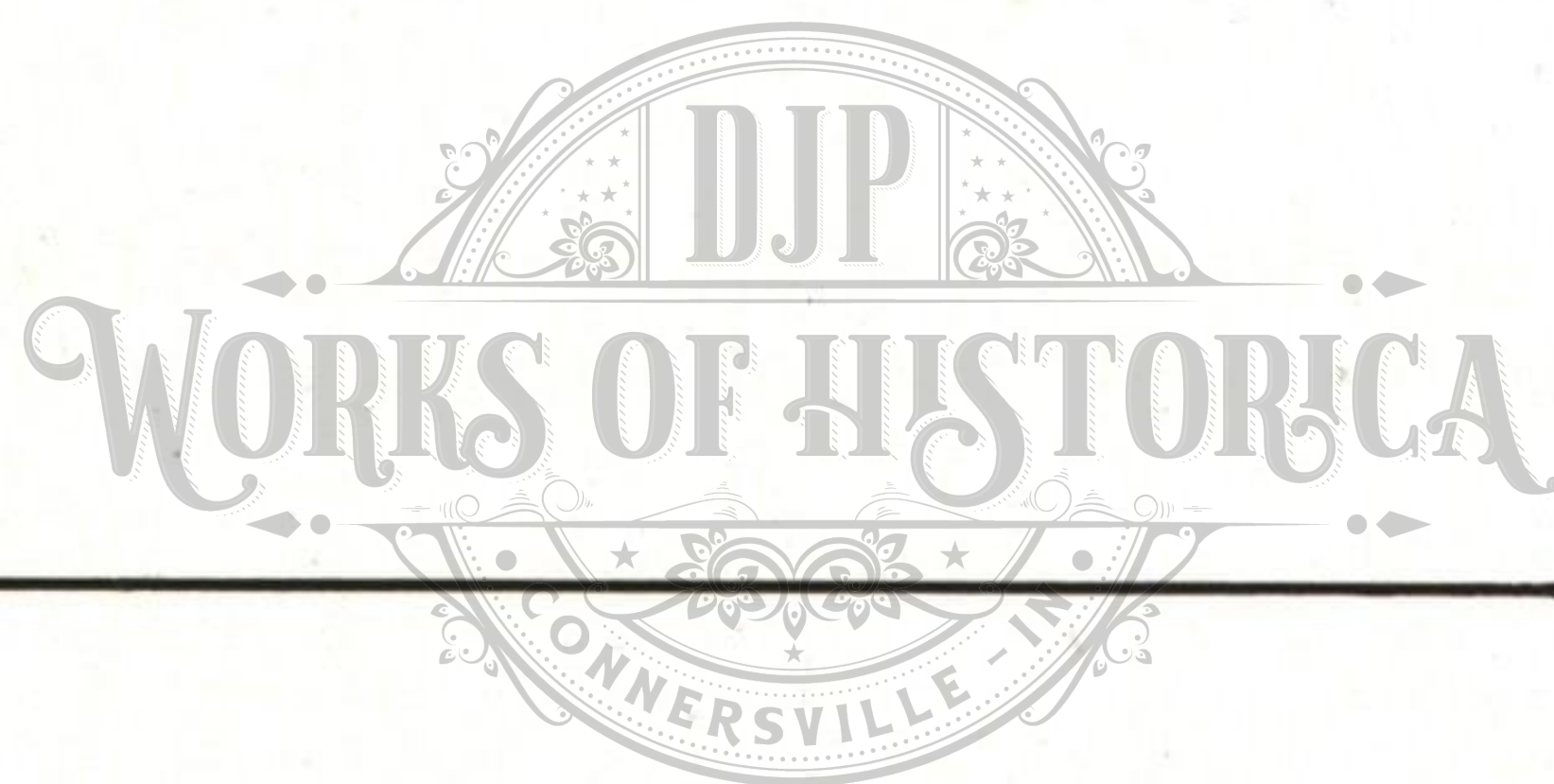
NO ORDERS FOR PARTS WILL
BE ACCEPTED AT THE FACTORY UNLESS
ACCOMPANIED WITH THE SERIAL
NUMBER OF THE CAR ON WHICH
PART IS TO BE INSTALLED. THIS NUMBER
APPEARS ON PLATE ON DASH
UNDERNEATH THE HOOD



IMPORTANT !

EVERY DRIVER SHOULD READ THIS SECTION WITH MUCH CARE

It is extremely important that the following instructions be studied carefully—especially by those not already familiar with the care and operation of an automobile.



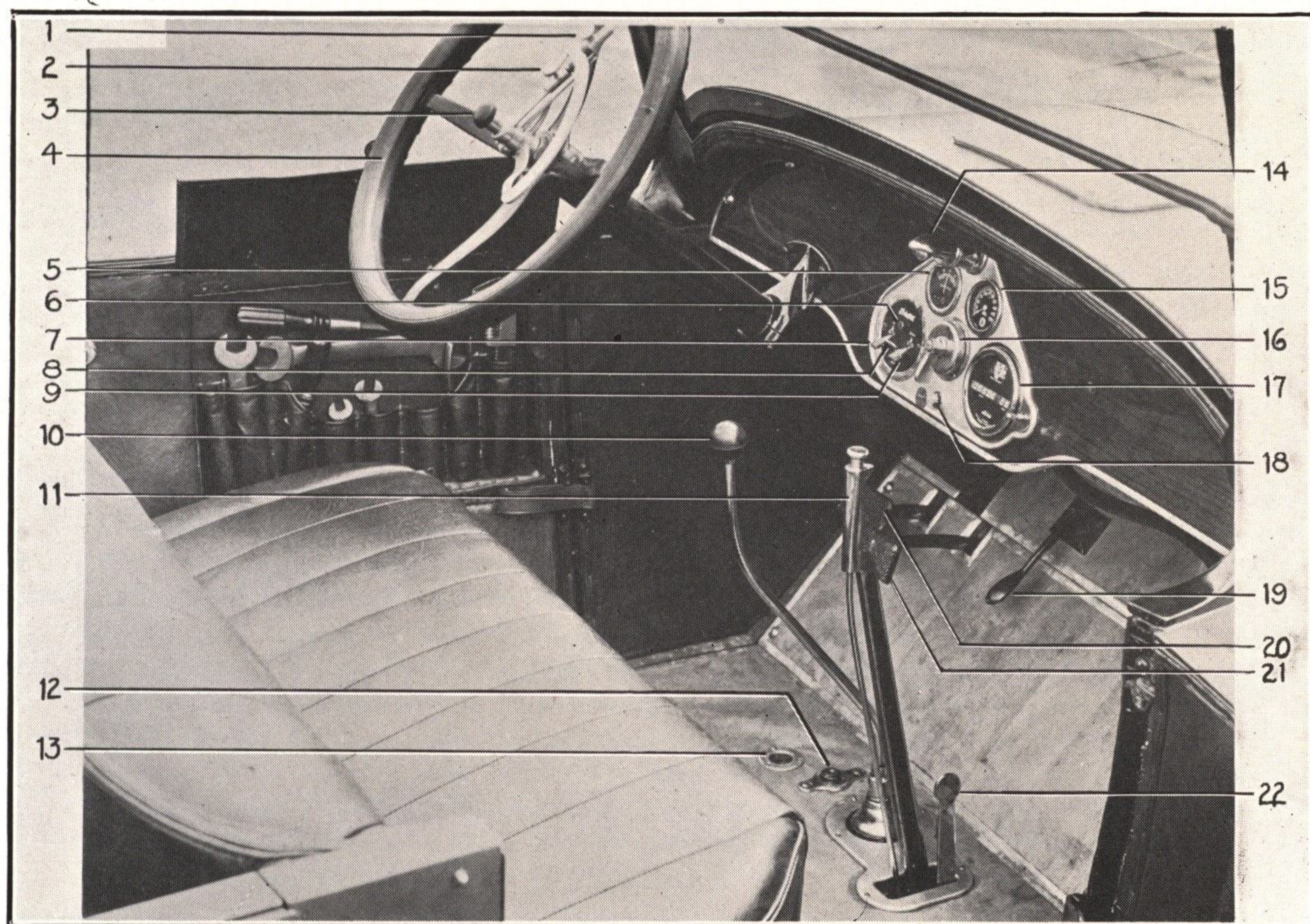


PLATE A-1—Instrument Board Panel and Controls.

- 1—Throttle.....
- 2—Spark Lever.....
- 3—Horn Button.....
- 4—Steering Wheel.....
- 5—Ammeter.....
- 6—Automatic Cut-out Switch Button.....
- 7—Lighting Switch.....
- 8—Ignition Switch and Key.....
- 9—Bright and Dim Light Switch.....
- 10—Gear Shift Lever.....
- 11—Hand Brake.....
- 12—Starter Button.....
- 13—Air Pump Control Opening.....
- 14—Instrument Board Light.....
- 15—Oil Pressure Gauge.....
- 16—2-Way Head Lamp Valve Lever.....
- 17—Speedometer.....
- 18—Carburetor Choker.....
- 19—Accelerator Pedal.....
- 20—Clutch Pedal.....
- 21—Service Brake Pedal.....
- 22—Muffler Cut-out Lever.....

SEE PLATE A-1.

FIVE MINUTES OF IMPROPER HANDLING WHILE YOUR CAR
IS NEW MAY CAUSE YOU BOTH EXPENSE AND ANNOYANCE

PREPARING THE CAR FOR SERVICE

The gasoline tank and cooling system of all cars are drained before being shipped from the factory. Before placing the car in service, replenish the gasoline and water supply. If the car is received through a Dealer, he may have already done this for you, but it is well to check over this point. The cooling system should be filled with an anti-freezing solution instead of water, if the car is received during winter, when the temperature is down to freezing. (See page 41 for anti-freezing solutions.)

The car should be thoroughly lubricated in accordance with the instructions under "Lubrication" on pages 23 and 25.

FILLING THE RADIATOR

Before attempting to start the engine, remove the cap on the radiator, by turning it to the left, and pour in water until it rises above the bottom of the screen. Use rain water, or soft water, at all times if it can be obtained. Most well water, or hard water, contains minerals that become deposited inside the radiator and cylinder jackets in the form of scale and sediment, which will make trouble in time by causing the engine to overheat. Be sure that the drain cocks at the bottom of the radiator and the pump are closed.

FILLING THE GASOLINE TANK

The main fuel supply tank at the rear of the car has a capacity of eighteen gallons. To fill it, remove the cap and pour gasoline in through a funnel having a wire screen or chamois skin in it arranged so that the gasoline will be strained. Be very careful that the gasoline is absolutely free from all sediment, water, and lint. *Be sure to have the funnel in contact with the filler flange when filling the tank.*

PUTTING OIL IN ENGINE

Obtain a supply of good oil, as this is the "blood" of the engine, and much of its life and dependability rests on the quality of oil used (oils of medium grade preferred). Pour in filler cap, in top of engine over cylinder head a sufficient amount to bring oil up to high level indicated on the bayonet gauge in left side of crankcase. Give the oil time to flow down through the engine. This engine requires about two gallons of oil to register "Full." Any more than the "Full" mark will cause smoking and foul the cylinders and plugs. Add enough oil at intervals (each time gasoline is needed would be a good calendar) to maintain this oil level.

TIRE PUMP

An engine-driven tire pump attached to the side of transmission is included in the equipment to assist the owner in keeping his tires properly inflated. Hose long enough to reach any tire on the car furnished.

To use pump, connect up the hose to the tire and with the lever throw the gear in mesh. This can be done while engine is running slowly.

The proper lubrication of the pump is important. The piston is lubricated by rubbing against an oil-soaked wick. Tire pump is located on side of transmission under front floor board.

PRELIMINARY TO STARTING THE ENGINE

(See page 67)

Inspect the bayonet type oil level gauge on the left side of the engine. See that it indicates a full crankcase.

STARTING THE ENGINE

Make sure that the gear shifting lever is in neutral position. It is in neutral position when it can be moved sideways freely.

Push spark and throttle levers up as far as they will go (retard position). Push the ignition key down. Pull out on the carburetor adjuster as far as it will come. Step on the starting button (See plate A-1). *As soon as engine starts, open throttle lever about two inches, and take the foot off the starting button.* It is necessary to move the throttle lever down to keep from flooding the engine with gasoline, as with throttle closed and with the carburetor adjusting button pulled out as far as it will go, a by-pass is opened around the throttle valve in the carburetor, giving a priming charge of raw gasoline, which is for starting a cold engine, as in winter starting. Never hold foot on starting button after engine is running as this is unnecessarily wasting current from battery. Advance spark lever about one third way down the quadrant. Carburetor adjusting button can now be pushed in slightly, feeling, as it were, for a point where engine runs best (firing evenly). As soon as engine warms up sufficiently, this button can be pushed in as far as it will go and should be left in this position while operating the car when the engine is warm, as this position is most economical, besides giving the proper mixture of gas. With a warm motor, as in warm weather, it will not be necessary to use carburetor adjustment in starting; simply open throttle about an inch or so. (Also remember it is not necessary to prime a warm engine.)

AFTER ENGINE STARTS

Advance the spark by moving small inner lever toward the bottom of the quadrant. (See plate A-1).

Close throttle by pushing throttle lever up so that engine idles slowly.

Push carburetor dash adjustment in. (In cold weather the engine must be warmed up with the carburetor dash adjustment about half way out.)

Note whether the oil pressure gauge on the instrument board shows a pressure reading. If the gauge does not show oil pressure, stop the engine and inspect the pump, as explained under the lubricating system, page 25.

FAILURE TO START

In case the starting motor does not turn the engine over, due to the engine being too stiff or the battery discharged, start the engine as follows:

Close the throttle and pull the carburetor dash adjustment out all the way, and then turn it over four times with the hand crank (ignition OFF).

Push carburetor dash adjustment in half way.

Turn on ignition. (Be sure ignition cut-out button is fully depressed.)

Retard the spark.

Pull the engine over compression as quickly as possible, with hand crank. (Always pull up on starting crank, and stand squarely in front of the car, in such a position that it would allow your arm to move in a counter-clockwise direction, in case the engine backfired, then there would not be the danger of breaking your arm. Do not try to start the engine by continuous cranking with the carburetor

dash adjustment all the way out. It will flood the cylinders with raw gasoline. Failure to start will more often be due to an over-rich mixture than one that is too lean. If car does not start after this, read "Troubles" on pages 17 and 18.

TO START CAR

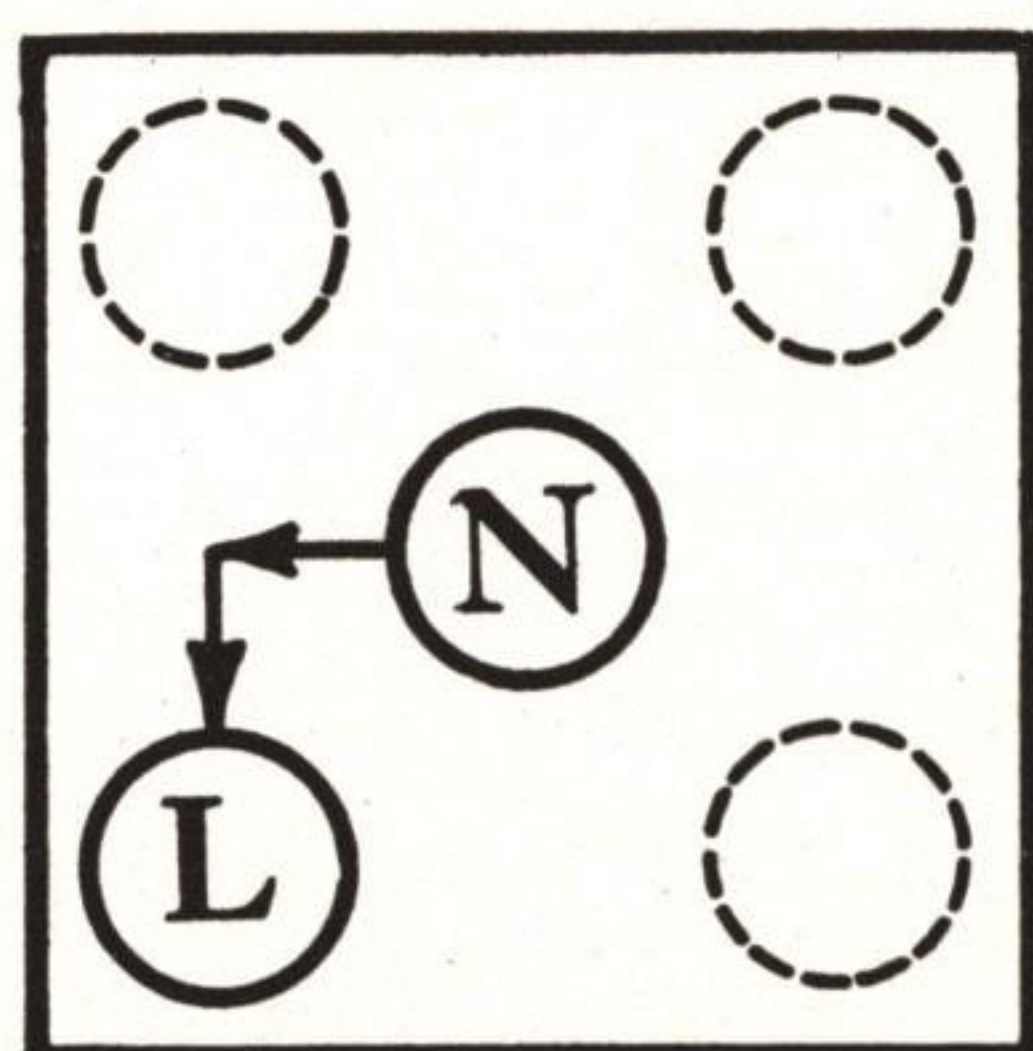
Release hand brake. (Release ratchet latch by depressing button in handle, and push lever all the way forward.) See Plate A-1, page 9.

Release clutch. (Depress clutch pedal.)

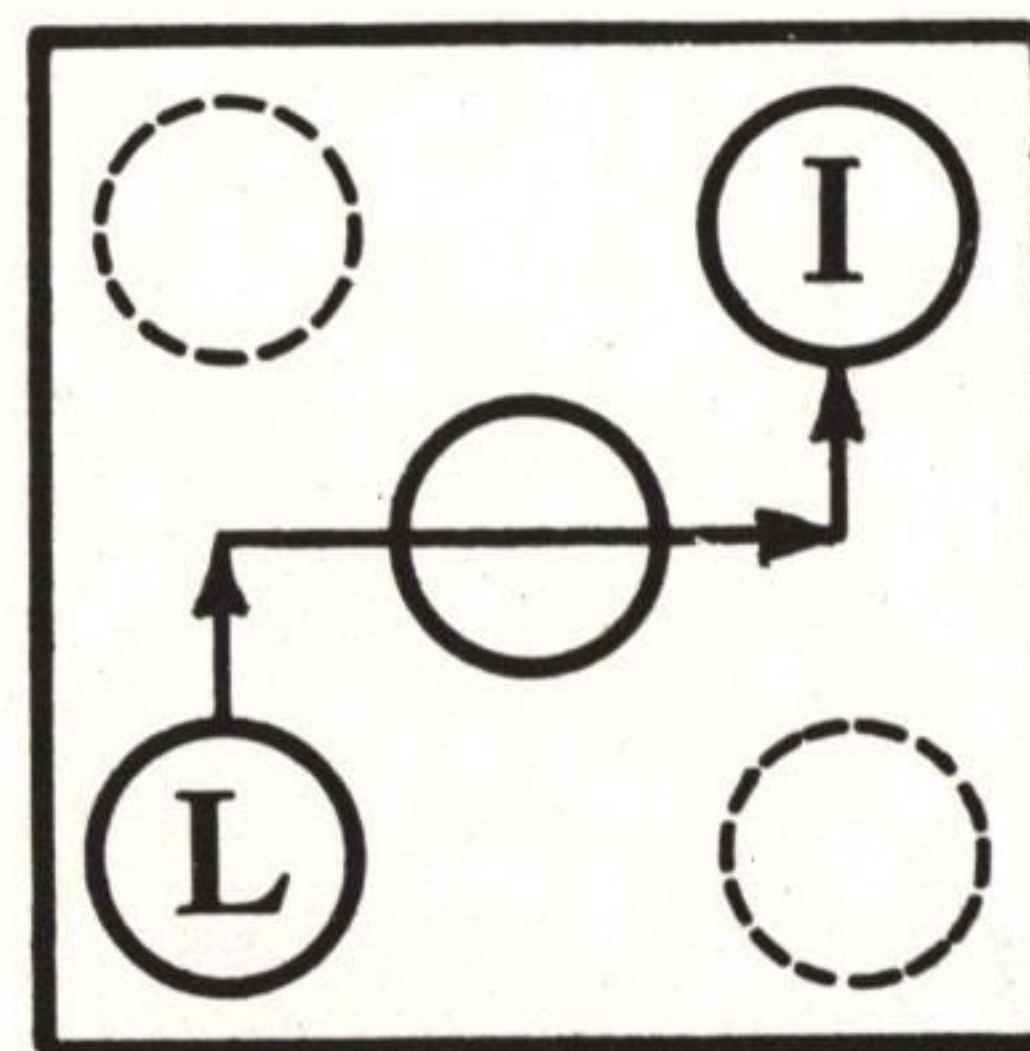
Engage low speed gears. (Rock change speed lever toward driver's seat and pull backward. See Plate 1, Below.

Increase engine speed by depressing foot throttle pedal.

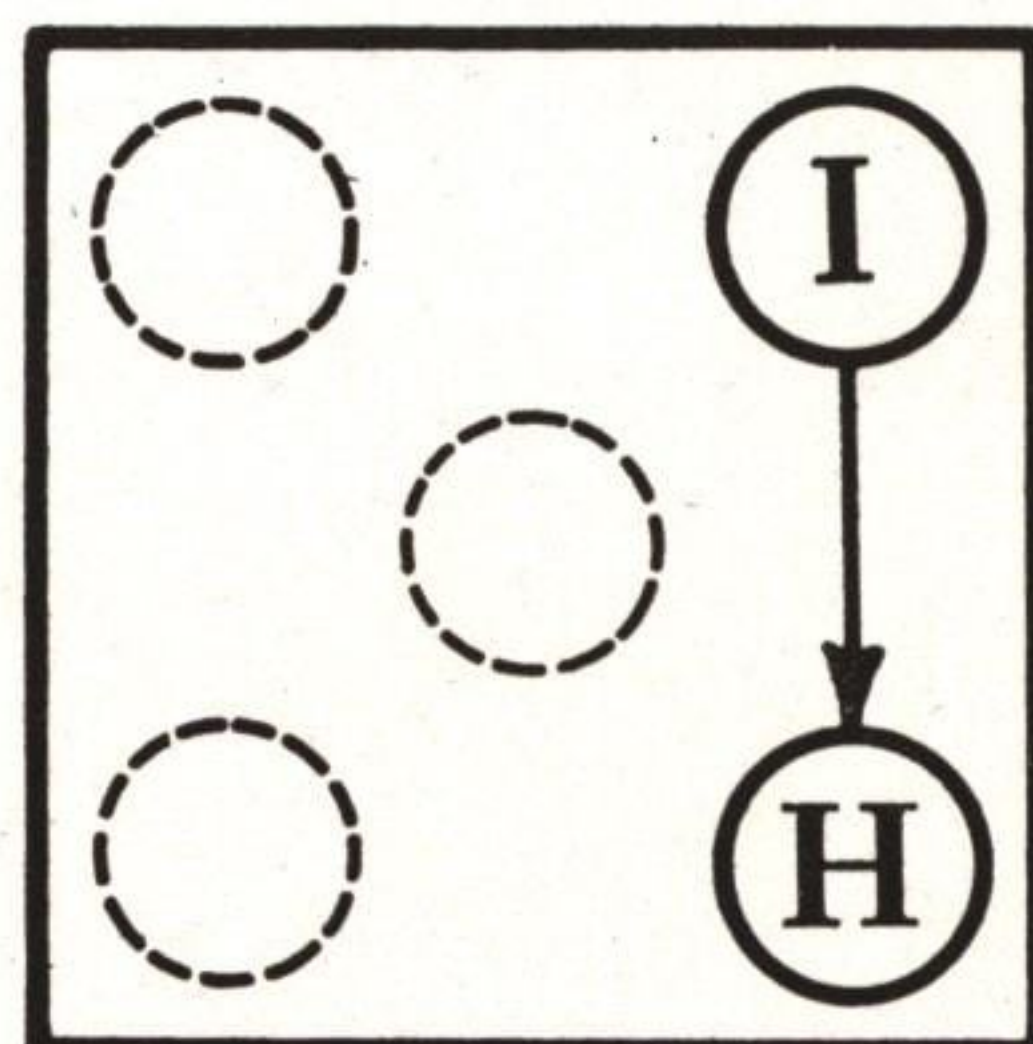
Slowly engage clutch. (Let up on clutch pedal.)



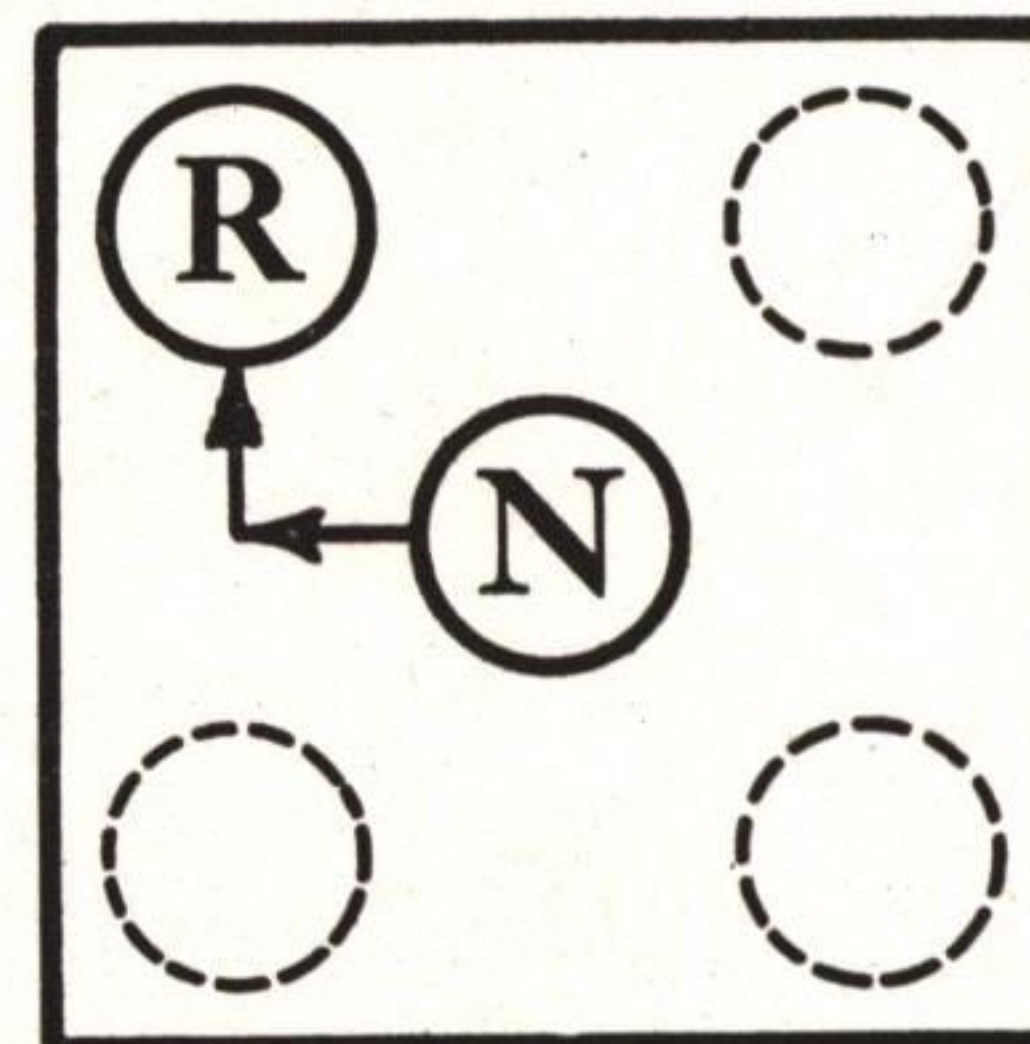
Neutral to Low—Rock lever to left and pull back



Low to Intermediate—Push lever thru Neutral, rock to right and push forward



Intermediate to High—Pull lever straight back



Neutral to Reverse—Rock the lever to left and push forward

PLATE 1—Diagram Showing Gear Shift Lever Position.

GEAR CHANGES

As car gains momentum, again throw out the clutch and release the pressure on the foot throttle, at the same time pushing the shifting lever forward into neutral and then over into second speed. Before the car has a chance to slow down much, let the clutch in gradually as before, at the same time accelerating the motor with the foot throttle. If you do not succeed in meshing the gears properly on this shift, put the lever in neutral, stop the car, and try it over again.

When the car has attained the speed of ten or twelve miles per hour in second speed, throw out the clutch. Pull the lever into neutral, pause for an instant with foot off the throttle and then pull the lever back into high.

Drive on high speed as much as possible.

TO CHANGE BACK TO LOWER SPEED

Sometimes, in climbing a hill, in or mud or sand, or in congested traffic, it is desirable to shift into a lower speed.

Throw out the clutch. Put the lever in neutral, at the same time speeding up the motor slightly, then engage the gear desired.

The knack of changing gears quietly consists in throwing the clutch all the way out, when shifting from a lower to a higher speed, so that the clutch brake plungers slow the clutch down. The opposite holds true in shifting from a higher to a lower speed as the clutch must be kept revolving. To do this the clutch pedal is depressed slightly, and the gear shifted as above. Quiet gear shifting avoids undue wear on the transmission gears.

Never attempt to put the gears in reverse while the car is moving forward, nor to go into a forward speed when the car is moving backward, because it will probably ruin the gears.

TO STOP CAR

Reduce engine speed.
Disengage clutch.
Apply brakes.
Place gear shift lever in neutral.
Apply hand brake before leaving car.

TO REVERSE CAR

Reduce engine speed. (Take foot off accelerator pedal.)
Release clutch.
Apply foot brake until car stops.
Engage reverse gear and clutch. (See Plate 1, Page 12.)
Never engage reverse gear when car is moving forward.

TO STOP ENGINE

To stop the engine, push the ignition key up.

It is good practice to push the throttle lever about one-half way down the quadrant while the engine is still running, after the switch has been turned off. This allows the cylinders to become filled with fresh gas, which will make the starting of the engine easy the following time. Be certain that the switch is always off when engine is not running. In order to guard against any trouble, such as running battery down should the switch be left on at any time, we have provided an "*automatic kick off*" on inside of switch housing, operated electrically, to break the connection in about thirty to forty-five seconds. Switches should be locked when car is to be left standing unattended to prevent unauthorized persons from operating same.

SKIDDING

Skidding is the veering around of the rear of the car when the tires fail to grip the road properly, due to sudden turning, or sudden application of the power or brakes on a wet or icy pavement.

When you feel the car skidding, turn the front wheels toward the same side as the

rear end is slipping, at the same time throwing out the clutch. It is not always possible to control skidding, even by the use of tire chains, so it pays to drive carefully on slippery roads and streets.

CONTROL SYSTEM

Practice should be taken in starting and stopping the car. Pressing down on the clutch pedal. Left one releases the clutch—that is, disengages the clutch. It should always be allowed to return to its normal position very gradually. The right pedal operates the service brakes. The center lever extending through the floor nearest the steering wheel is the gear shift lever. The other lever operates the emergency brake. When the gear shift lever is in its center position, it is in the neutral position—that is, no gears of the transmission are in mesh, and the car will not move, even though the engine is running and the clutch is engaged.

It is often helpful to shut off the engine entirely, and then go through the steps of shifting the gears. Pulling the gear shift lever to the left and back gives the correct position for first, or low speed. Shifting the lever back to the neutral position and then to the right and forward gives the second or intermediate speed. Pulling the lever back to the right gives the third, or high speed. The reverse speed is obtained by shifting the lever from neutral position to the left and forward. In going from first to second speeds, or to the reverse, it is always necessary that the lever be shifted to the neutral position first and then to the desired position. Try shifting the lever to each position several times to become acquainted with the different positions. Always bring the lever to neutral position so that no gears will be in mesh when the motor is started again.

SPARK AND THROTTLE CONTROL LEVERS

On top of the steering wheel will be found two levers. The longer one controls the throttle valve in the carburetor that admits the gas to the cylinders. Pushing up closes and pulling down as far as it will go opens the throttle valve. The inner or short lever controls the timing of the spark so as to make it occur earlier or later in the explosion stroke of each cylinder of the engine. Pulling down advances the spark, or makes it occur earlier, and pushing up retards it. The signal horn is operated by the push button in the center of the wheel.

FOOT THROTTLE, OR ACCELERATOR

The lever on the floor at the right of the brake pedal controls the carburetor throttle valve. The same control of the speed of the motor is obtained by using either the hand lever or accelerator. When the foot is removed from the foot throttle or accelerator, the motor speed drops down to that speed, determined by the position of the hand lever. In using the accelerator, the hand lever should be set so as to allow the car to run slowly on high gear or direct drive. Never push down on the accelerator suddenly unless in case of emergency, since the sudden increase in speed produced subjects the entire car to wear that can well be avoided. The man who always has a smoothly running car is the one who is content to handle his car gently.

HOW TO USE THE BRAKES

Never apply brakes harshly except in cases of emergency. It is hard on tires.

In descending long, steep grades, do not disengage clutch and allow car to coast, but close throttle, retard spark, and allow motor to hold car, using brakes only to help motor. *This is far safer.* In fact, never kick out the clutch unless it is absolutely necessary.

In approaching a rough place, or a turn in the road, leave clutch in, close throttle, and apply only enough brake to accomplish the desired result. This is easier on the car, more economical in fuel, and far more comfortable to passengers. After passing turn you have only to release the slight pressure on brake, open the throttle, and speed up without jerks or racing of motor, slipping clutch to get started, and all unnecessary labor. In fact, you have saved time in doing so.

CLUTCH

The clutch is a means of breaking the connection between the engine and the rear wheels. It consists of a series of plates that are held firmly together by means of coil springs. The driven plates, or friction discs, are mounted on the shaft that extends through the transmission and must turn with this shaft. The driving plates are attached to the fly wheel and turn with it. Consequently the shaft which extends back to the transmission must also turn when this pressure is applied. This pressure is removed when the clutch pedal is pushed down. This action causes the coil springs to be pushed back so that the friction discs are no longer held between the plates and fly wheel. The engine may then run without turning the transmission shaft.

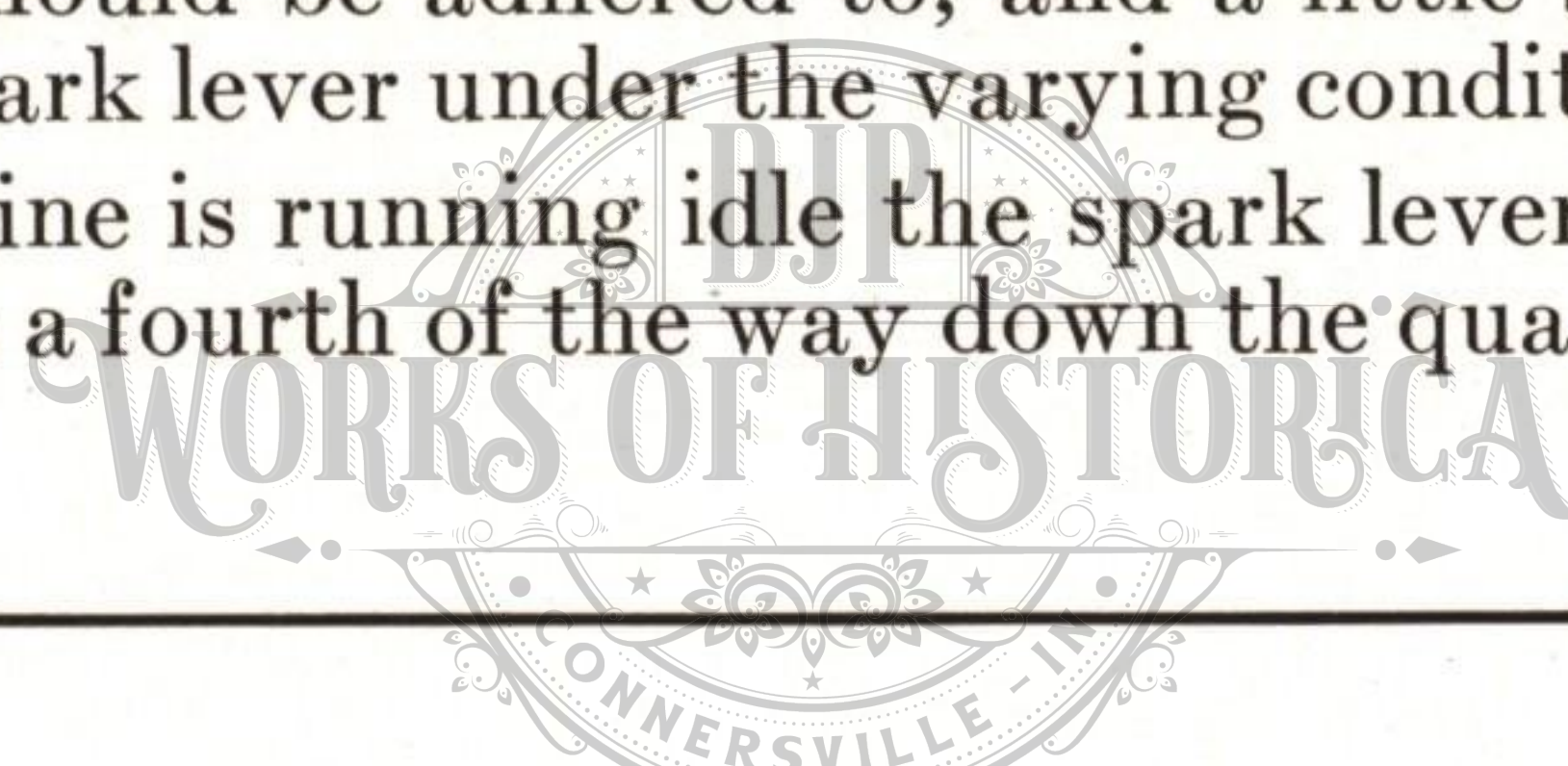
USE THE SPARK LEVER

The position of the spark lever should vary with the speed of the motor. For persons who are operating their first car, it simplifies the driving if the spark lever can be left in one position. About the best rule that can be given is to imagine the quadrant divided in proportion to the car speed, assuming that the spark should be fully advanced for the maximum speeds.

In following out this idea, the spark lever should be advanced to a position one-quarter of the way down the quadrant for speeds of ten to fifteen miles per hour; a position approximately in the center of the quadrant for speeds of twenty to thirty miles; a position of three-fourths the quadrant for thirty-five to forty miles, and full advance for all higher speeds. If it is desired to leave the spark lever in a fixed position, the position for average conditions of between one-fourth and one-half way down the quadrant will give fair performance, but the power and general economy will be affected in the extremes of speed variation. The spark should be fully retarded when the car is to be throttled to its lowest speed on high gear.

The general principle to follow is to keep the spark advanced as fully as possible. If advanced too far a sharp, metallic click will be heard in the engine and the spark should be retarded or the bearings will be damaged by having the spark occur too early. A fully retarded spark will cause excessive heat and loss of power, since the spark occurs after the piston has started down on the explosion stroke. Neither extreme should be adhered to, and a little study will soon show the best position for the spark lever under the varying conditions.

When the engine is running idle the spark lever should not be advanced to a position more than a fourth of the way down the quadrant.



COLD WEATHER SUGGESTIONS

WATER SYSTEM

The most important thing in cold weather is to fill the radiator and water jackets with good anti-freeze mixture. This may be purchased from a reliable dealer or may be made from the following formulae:

For temperature not lower than 5 degrees below zero:

Denatured Alcohol.....	15%
Pure Glycerine.....	15%
Water.....	70%
Or else 30% Alcohol and 70% Water.	

For temperature not lower than 20 degrees below zero:

Denatured Alcohol.....	30%
Pure Glycerine.....	20%
Water.....	50%

Alcohol must be added occasionally to make up for evaporation.

If for any reason anti-freeze mixture is not obtainable, the radiator plug should be removed and the system drained on leaving the car, to prevent cracking the cylinders and radiator.

There is a drain cock under the left-hand side of the radiator which should be opened. There is also a drain cock on the water pump which should be opened.

Due to regulating action of the thermostat the water in the cylinder block is kept at a temperature of about 150° Fahrenheit.

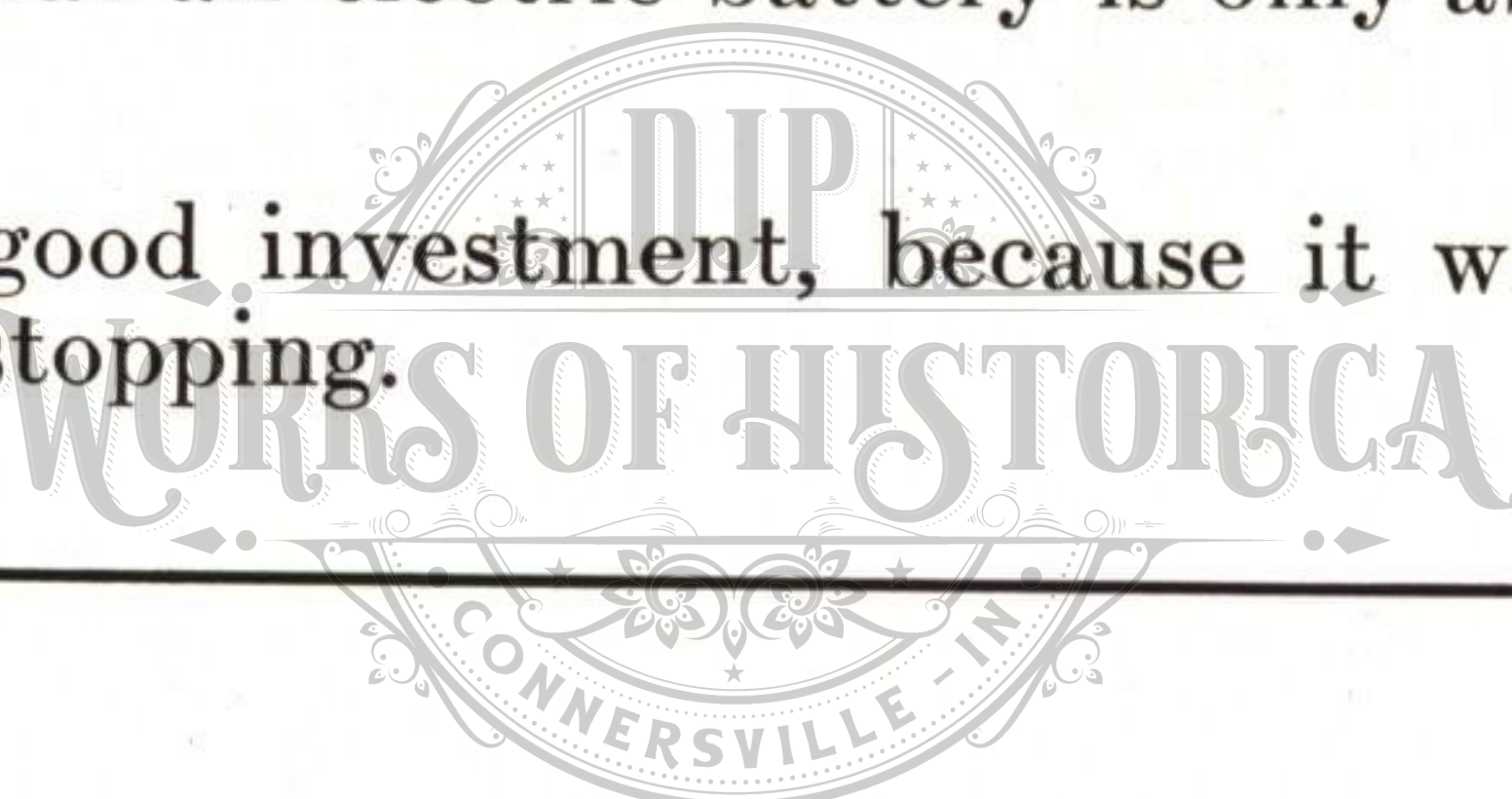
STARTING THE MOTOR IN COLD WEATHER

When the car has been standing for some time in the cold the gasoline vaporizes very slowly. The dash adjustment for the carburetor should be pulled all the way out, the throttle opened just a little, and the spark pretty well retarded. If very cold, the throttle should be closed entirely. If the motor does not start readily it is advisable to prime the cylinders with high test gasoline, or with a mixture composed of half alcohol and half ether.

A small quantity is all that should be used, say about half a teaspoonful to each cylinder. Introduce it into the cylinders through the spark plug ports.

Be sure not to run your starting battery down by long cranking without priming. Remember that an electric battery is only about fifty per cent efficient in cold weather.

A hood cover is a good investment, because it will retain the heat in the motor a long time after stopping.



TROUBLES

ENGINE FAILS TO START

Lack of gasoline.

See that tank is full, shut-off cock open, gasoline line not stopped up.

Ignition.

See that switch is on, no wire broken, spark plugs clean, and points properly set. Also be sure automatic kick-out is pushed clear in.

ENGINE STOPS

Lack of gasoline.

Disconnected wires or switch.

Lack of oil, or water. (Heating will show on Motometer before this occurs.)

Carburetor flooding.

Loose or broken vacuum line from intake manifold to vacuum tank.

ENGINE MISSES

Broken or disconnected wiring.

Dirty spark plugs:

Short circuit each plug, one after the other, until one is found that makes no difference in the running of the motor. Remove and clean that plug. Be sure porcelain is not cracked.

Spark plug points improperly set:

Gap should be .025 inch, or the thickness of a smooth dime.

Defective carburetor adjustment:

Have dealer adjust.

Lack of compression:

Valve may be sticking, dirt or carbon on valve seat, cylinder scored. To locate the weak cylinder, test each cylinder by turning the engine over by hand. (See Page 43, for grinding valves.)

Water in gasoline:

Engine will run by fits and starts. Drain carburetor float chamber and open vacuum tank pet cock.

Overheated motor (see Page 18.)

LOSS OF POWER

Lack of compression.

Too rich gasoline mixture.

Engine too cold.

Missing motor (see above).

Weak ignition.

Lack of oil or water.

Gasoline line partly stopped up.

Flat tires.

Dragging brakes:

Feel brakes with hand to see if they are hot.

POPPING BACK THROUGH CARBURETOR

- Too lean gasoline mixture. (See Pages 51 and 52.)
- Water in gasoline.
- Dirt in carburetor.
- Air leak in intake passage, carburetor gasket, or vacuum tank and connections.
- Inlet valve holding open.

ENGINE OVERHEATS

- Lack of proper lubrication.
- Radiator may need filling.
- Water passages may be stopped up.
- Driving with retarded spark.
- Slipping or broken fan belt.
- Too rich gasoline mixture, indicated by black smoke from exhaust pipes of mufflers.
- Carbon in cylinder head.
- The thermostat may not be opening properly. A piece of hose or pipe inserted in place of thermostat will tell you if it is causing the trouble.

KNOCK IN ENGINE

- Burned-out bearings.
- Bearings badly worn and in need of tightening. (See Page 57.)
- Lack of lubrication in engine. (See Page 33.)
- Faulty carburetor adjustment. (See Pages 51 and 52.)
- Loose piston. (See dealer).
- Carbon in motor. (See Page 43; also Page 48 for removing cylinder head.)
- Engine speed too slow on hill, or in mud or sand. Shift to lower speed. (See Page 13.)
- Radiator needs filling.

OIL GAUGE SHOWS NO PRESSURE

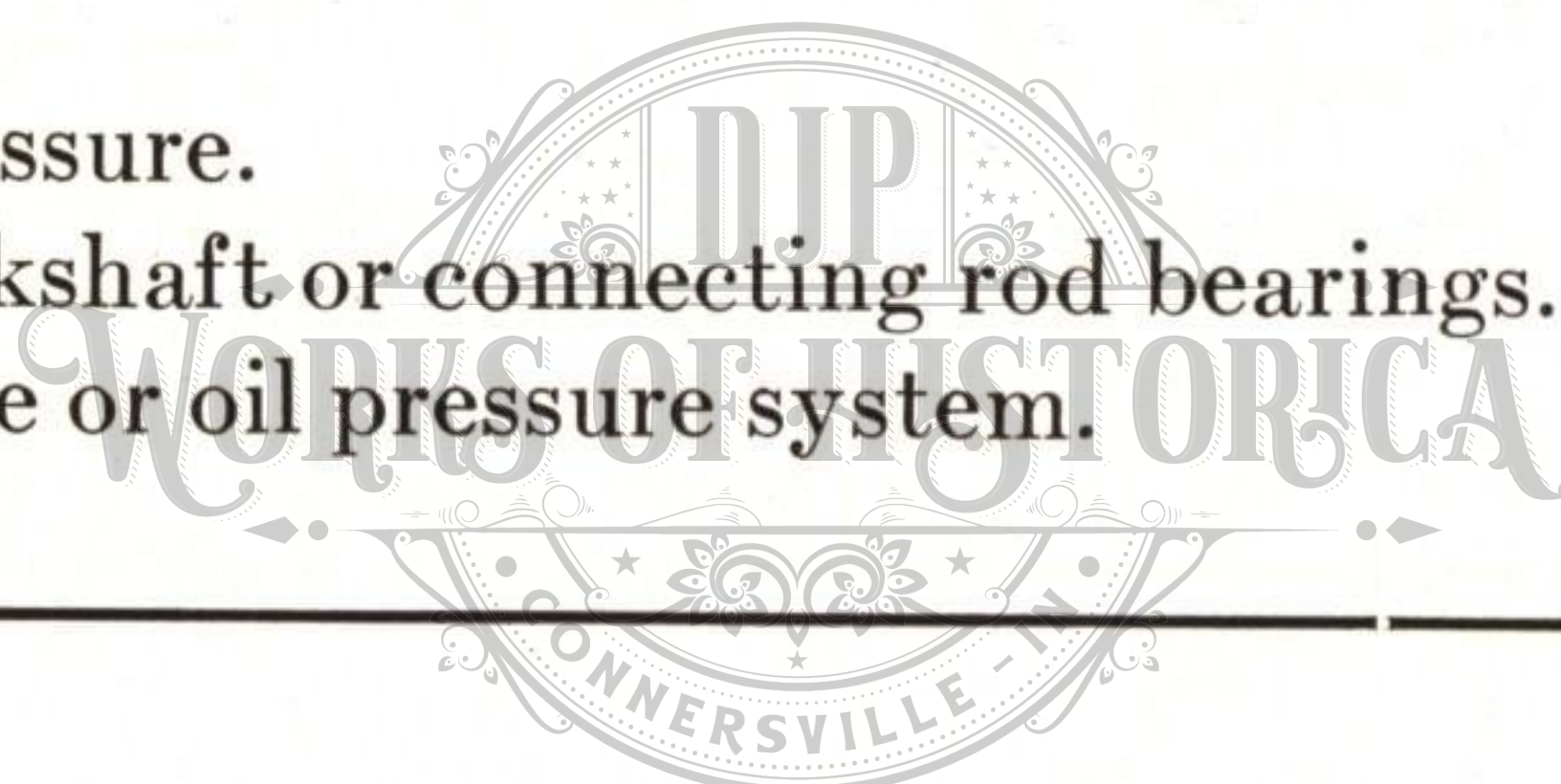
- (See "Lubricating System," Page 33.)

SQUEAKS

- Lack of lubrication, loose body bolts, spring clips, etc. (See paragraph 15, Page 26.)

ENGINE SMOKES

- Too much oil pressure.
- Badly worn crankshaft or connecting rod bearings.
- Leak in crankcase or oil pressure system.



STORING THE CAR

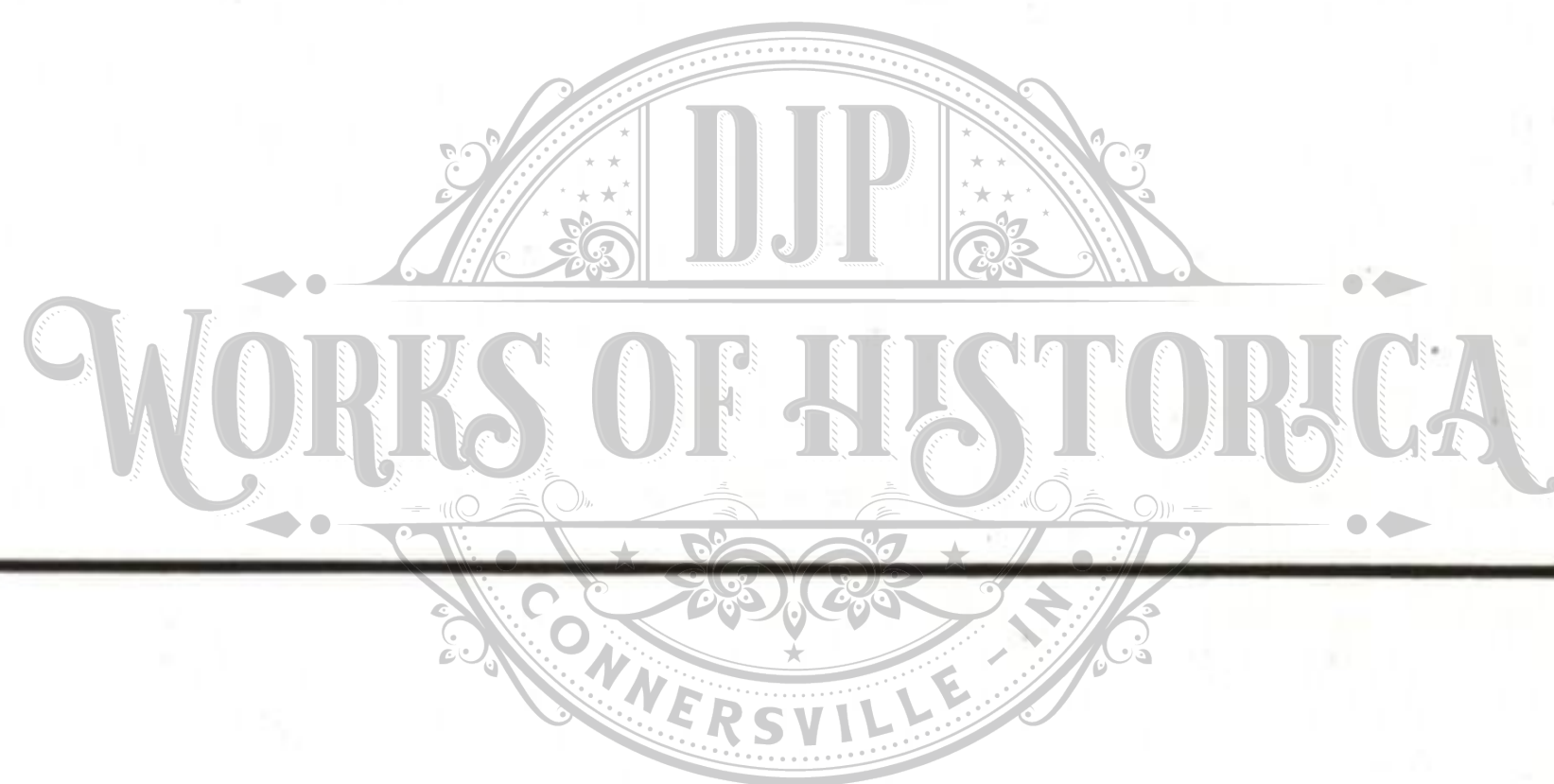
It is far better to keep the car in service the entire year, but circumstances often demand that the car be stored for several months, especially through the winter.

When the car is to be stored, drain the cooling and gasoline systems.

Give the car a thorough cleaning so that no dust or mud remains at any point. Jack up the wheels and remove the tires. Leave only enough air in the tubes to keep them stretched in shape. Wrap the tires in paper and keep in a dark, dry place. Paint the rims with a mixture of graphite and gasoline. Cover up the entire car with some sort of cover. A canvas or paper covering made especially for this purpose can be had at a slight cost.

We make no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers, or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers.

In event of trouble with these units, get in touch with the nearest Service Station of Manufacturer of unit. They carry large stocks of parts and you can obtain efficient and prompt *service* at all times.



DON'TS FOR GENERAL OPERATION

Don't attempt to run the car in crowded traffic until you completely master operation and steering!

Don't engage the clutch suddenly!

Don't release clutch while driving without first closing throttle!

Don't race the engine!

Don't attempt to shift into reverse gear until car comes to a complete stop!

Don't drive with a fully retarded spark!

Don't drive fast or attempt to stop suddenly on slippery pavements!

Don't drive fast around corners or over rough roads!

Don't apply brakes suddenly except in case of emergency!

Don't push the starter button while the engine is running!

Don't turn the steering gear when the car is standing, it is not only unnecessary but is decidedly bad practice!

Don't attempt to start the engine with the switch turned off or without gasoline in your tank!

Don't race the engine when it is not driving the car. There is no worse abuse!

Don't fail to keep the cooling system filled with water or, during cold weather, a good anti-freezing solution!

Don't fail to inspect the level of the acid in your storage battery not less than every 500 miles!

Don't only fill the engine with lubricant—lubricate all other parts of the car!

Don't fail to lubricate all parts of the car!

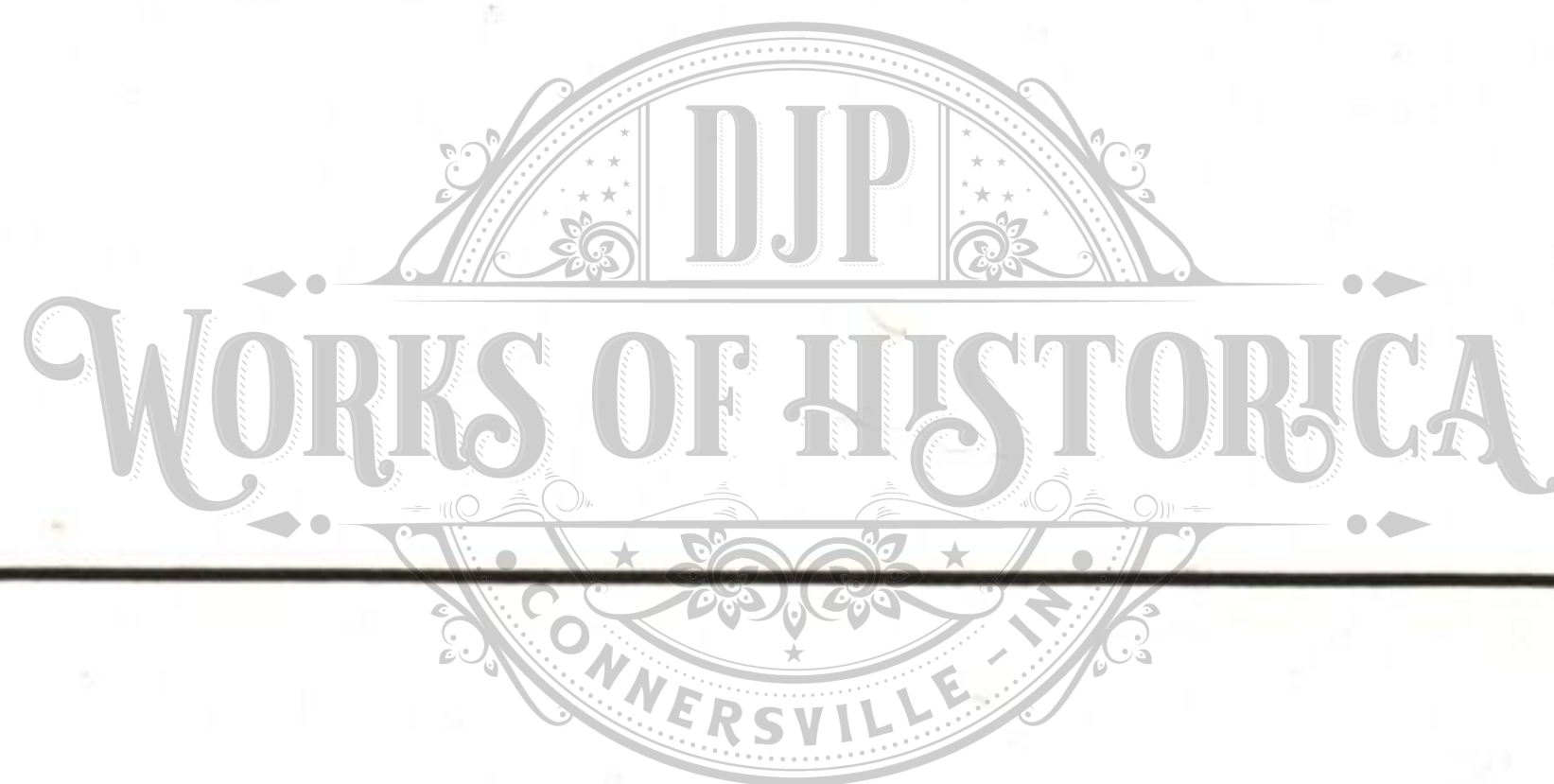
Don't fail to keep the tires properly inflated!

DON'T FAIL TO INVESTIGATE UNUSUAL SOUNDS WHICH DEVELOP.



NOTE

Do not become alarmed if on starting the motor, it seems a bit noisy at first. This is characteristic of all motors using constant pressure oil system. This noise will cease in a few minutes when the oil has had time to float the bearings, and the motor has warmed up sufficiently for expansion to take place. The Ansted Motor is quite different from the conventional types, and you will need to learn it, and find that, in many respects, the principles adhered to in its construction are quite different from those in use by those building conventional type motors.



LUBRICATION

NOTE

It is of the utmost importance that the oil be free from dirt and lint. Oil should be strained through a fine mesh brass or copper screen before using.

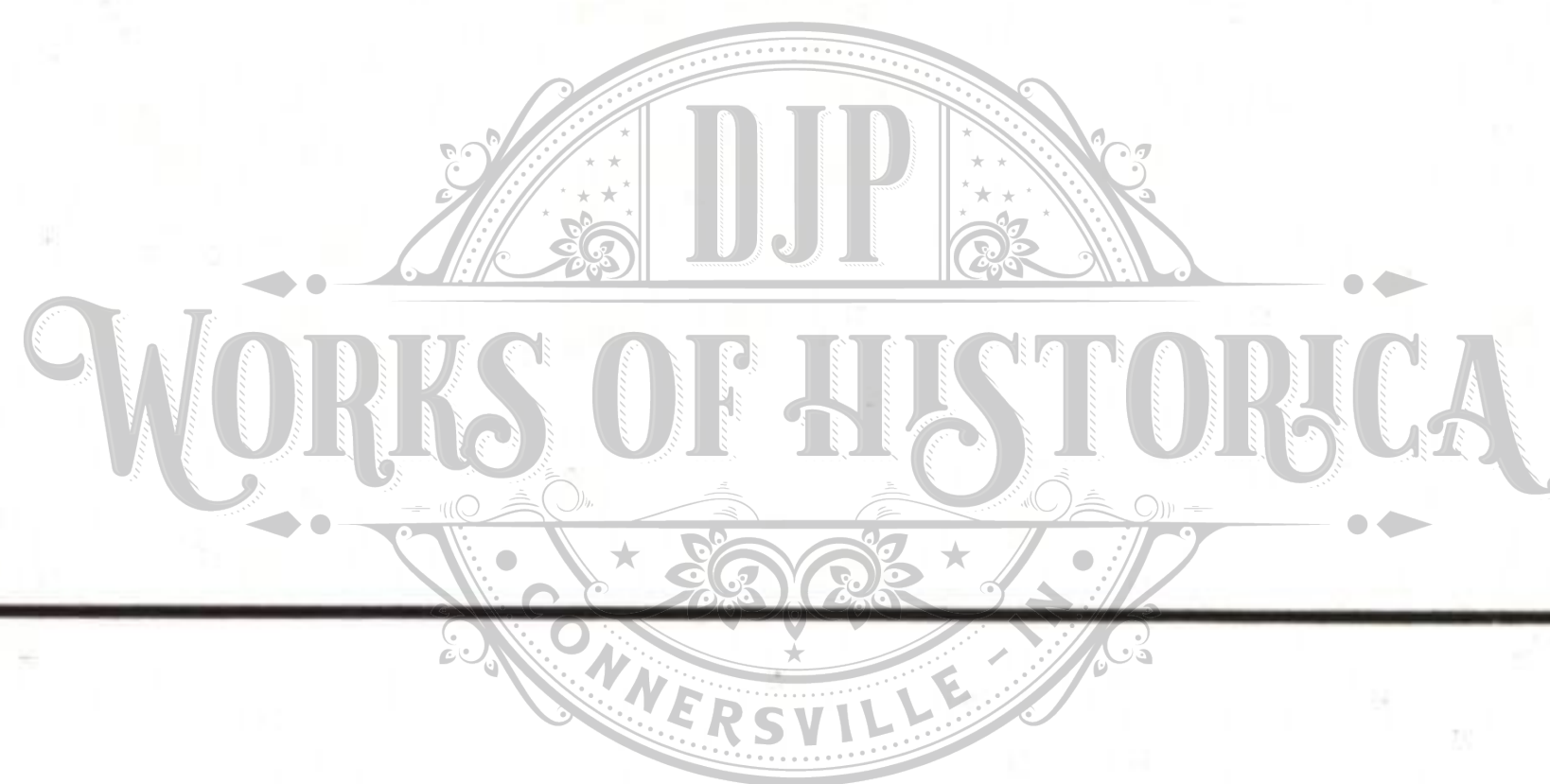
Attempted economy by the purchase of inferior or cheap grades of lubricating oil results in carbonized motors, burned out bearings, or other serious troubles. A good plan is to test your lubricants with blue litmus paper to be sure no acids are present. This will turn red if acids are present.

All moving parts of the Lexington car are manufactured with an unusual degree of accuracy and the parts are carefully assembled. In order to maintain the splendid running qualities of the car it becomes necessary to systematically introduce suitable lubricants between wearing surfaces.

The special object of this section is to point out the places on the Lexington that requires lubrication.

As it is impossible in every instance to give the exact information as to the time and amount of lubricant to use this information is based on average use.

Too much oil is better than not enough, but just enough is best—lubricate, but lubricate judiciously.



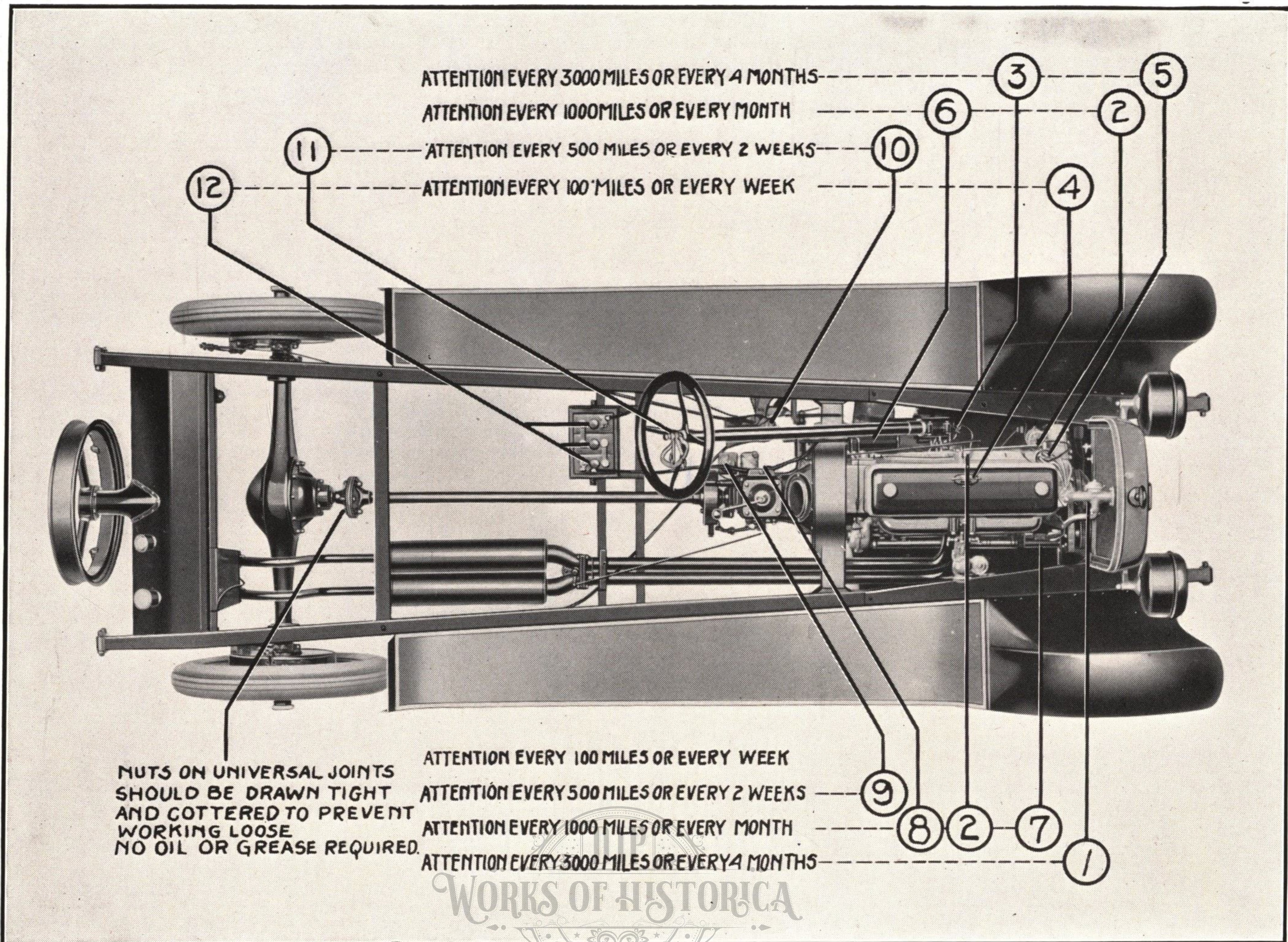


PLATE 2—Top Plan View of Chassis and Lubrication Chart

KEY TO FIGURES ON LUBRICATION CHART ON OPPOSITE PAGE

1—Fan

Fill fan with engine oil every 3000 miles.

It may be necessary to crank the engine in order to bring the oil hole to the top. (See detailed instructions on Page 27.)

2—Spark and Throttle Control Levers

Inject a few drops of oil in the ball joints and on control levers every 1000 miles.

3—Steering Gear

The internal mechanism of the steering gear should be lubricated about every 3000 miles. This can be done by removing plug in top of the case and filling with a grease gun. Use a neutral high grade soft cup grease, a slight amount of graphite can be added with this to obtain better results.

4—Engine

Add to the engine the amount of oil used the previous day. This is done by opening the filler cap in the cylinder head cover and pouring in the correct amount which will be registered on the blade type of indicator on the left side of the crankcase.

5—Circuit Breaker

The vaseline cup on the igniter should be unscrewed and filled with ordinary vaseline about every 2000 to 3000 miles. Under no circumstances should grease be placed in this cup!

6—Starting Motor

At all oiling places inject 6 to 10 drops of oil every 500 to 1000 miles and return all oil covers to a closed position. Overflow of lubricant at oiling places does not indicate that bearings have been properly lubricated, the oil passages may have an obstruction in them.

7—Generator

At all oiling places inject 8 to 10 drops of oil every 500 to 1000 miles and return all oil covers to a closed position.

8—Transmission

The transmission should always contain enough lubricant to bring it up to the level of filler on left side of case. A heavy oil is recommended for summer and half light and half heavy in winter.

The transmission should be inspected at least every 1000 miles of travel.

9—Tire Pump

When this pump is shipped from the factory it is lubricated sufficiently to last for six inflations without additional oiling. The piston requires but the very slightest of oil and too much is bad. It is only necessary to put into oilers 8 to 10 drops for each additional inflation.

10—Brake Cables

Remove boot and inject a small amount of oil into both housings every 500 to 1000 miles. Do not fail to return boot to its proper place.

11—Steering Column

Inject a few drops of oil into the steering wheel spider every 500 miles. The plungers in the spark and throttle control levers should be lubricated occasionally.

12—Battery

The electrolyte must always cover the plates. Replace evaporation by adding pure distilled water. NEVER ADD ACID.

If a plug is left loose, the solution may flood out of the cell, especially when the battery is being charged. If a plug is lost or broken, obtain a new one at once.

The specific gravity of the electrolyte to be used for replacing loss when spilled from the cells, or due to broken jars, should be the same as that of one of the adjacent cells. This can be determined by the use of the hydrometer syringe. (See pages 34 and 35.)

The acid must always be poured into the water very slowly, not the water into the acid. If a lower specific gravity than 1.300 is desired, water should be added to the electrolyte.

(See Page 23)

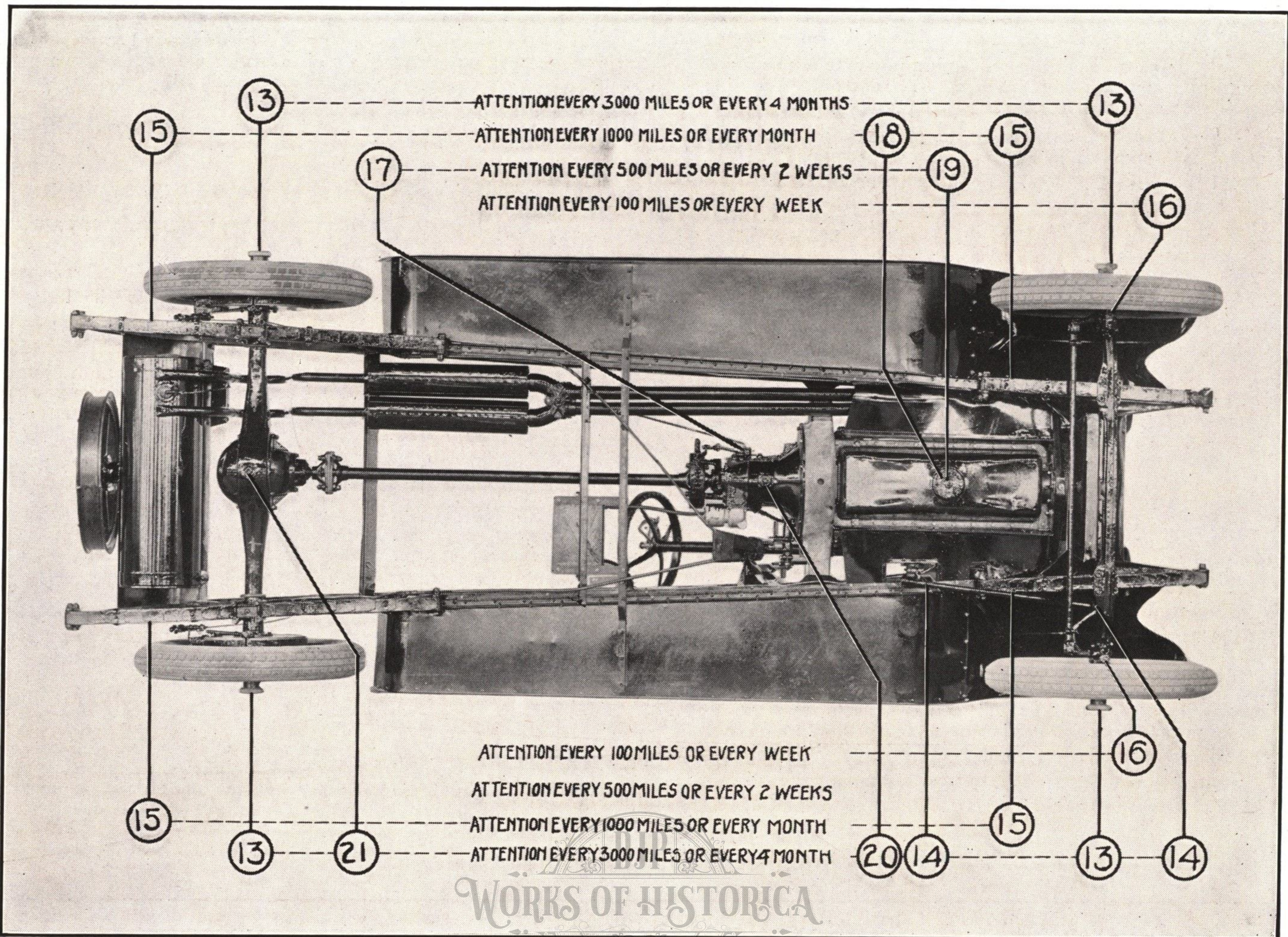


PLATE 3—Bottom Plan View of Chassis and Lubrication Chart

KEY TO FIGURES ON LUBRICATION CHART ON OPPOSITE PAGE

13—Wheels

All wheels should be removed and the bearings thoroughly cleaned and examined for foreign substances every 3000 miles. The bearings should be packed with a light grease; do not use a heavy grease as it will roll away from the races and will not return.

14—Drag Link

Remove drag link and fill with grease every 3000 miles.

15—Springs

It is recommended that the springs be lubricated once every 500 to 1000 miles. When springs are not lubricated water works its way in between the leaves and causes them to rust, often to such extent that they become almost like a solid piece.

It is a good plan to jack up the frame of the car occasionally so as to take the weight off the springs and insert oil and graphite between the leaves.

It also is a good plan, about once a year, to take all the springs apart and clean and coat the wearing surfaces with a thick mixture of oil and graphite.

16—King Pin

Fill oil cups on king pins on the front axle at least every two weeks.

17—Emergency Brake Connections

Every 500 miles a few drops of oil should be applied to the connections.

18—Oil Strainer

After every 1000 miles of travel the oil strainer should be removed and thoroughly cleaned, replaced, and the engine refilled. (Read instructions under paragraph 4.)

19—Replace Oil in Engine.

Replace oil in engine after the first 500 miles of travel and at the end of every 1000 miles thereafter, putting in two gallons.

During cold weather a certain amount of water may accumulate in the crankcase of engine as a result of condensation. The water thus formed either freezes, preventing the pump from drawing oil, or mixes with the oil, forming a thick substance which the pump cannot draw. It is necessary therefore during cold weather to drain oil pan and clean oil screen more often than during warm weather. Also there is a certain amount of kerosene constantly working into the crankcase in cold weather. This thins out the oil and ruins its lubricating qualities.

Unless the oil is drained out and the oil pan and screen are cleaned frequently enough in cold weather, serious damage to the engine may result, particularly on cars in short-trip service.

20—Transmission

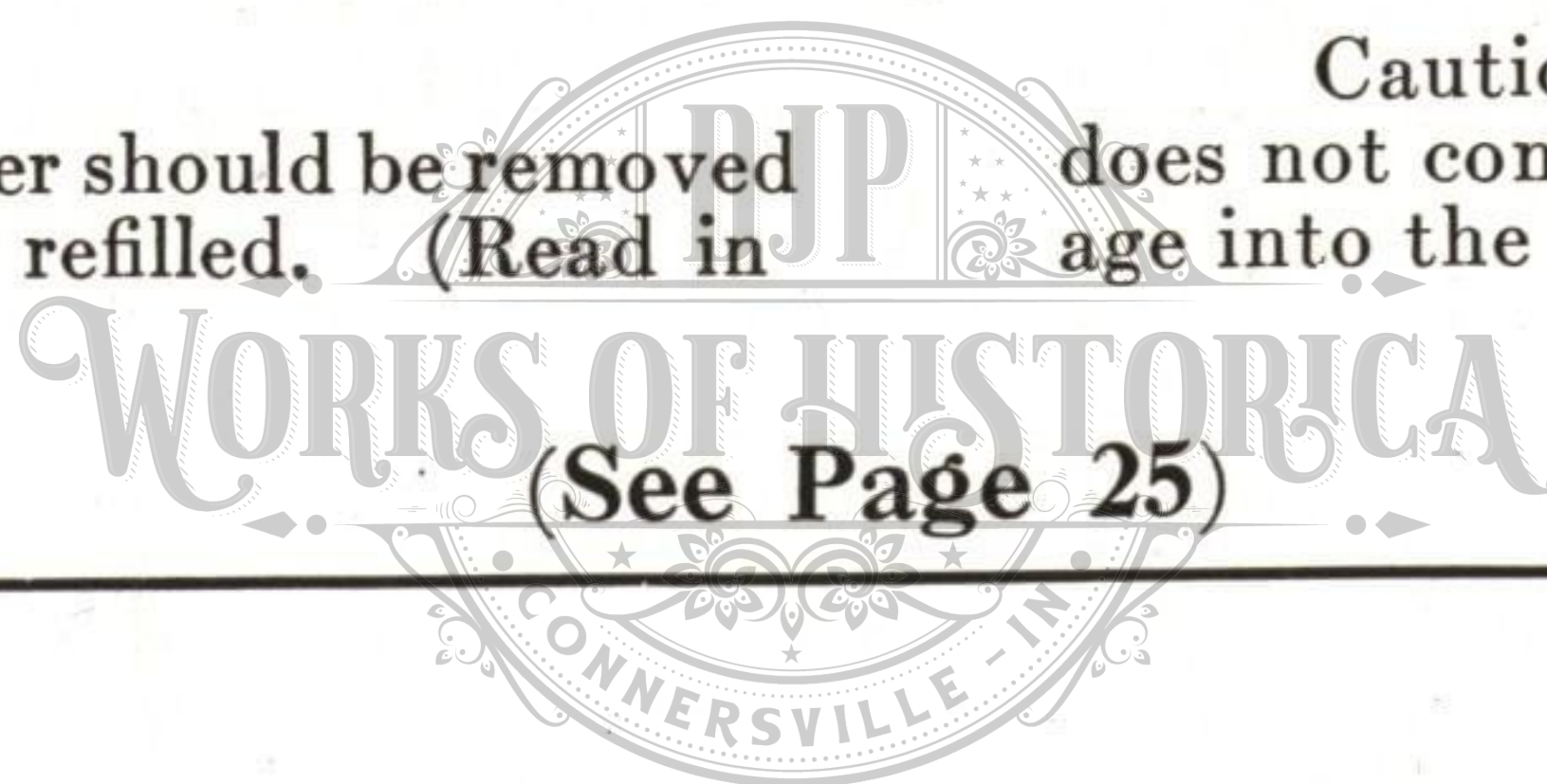
Transmission should be inspected monthly to see if oil level is correct. The oil should be up to the filler plug on the side of the transmission. Do not fill above this plug.

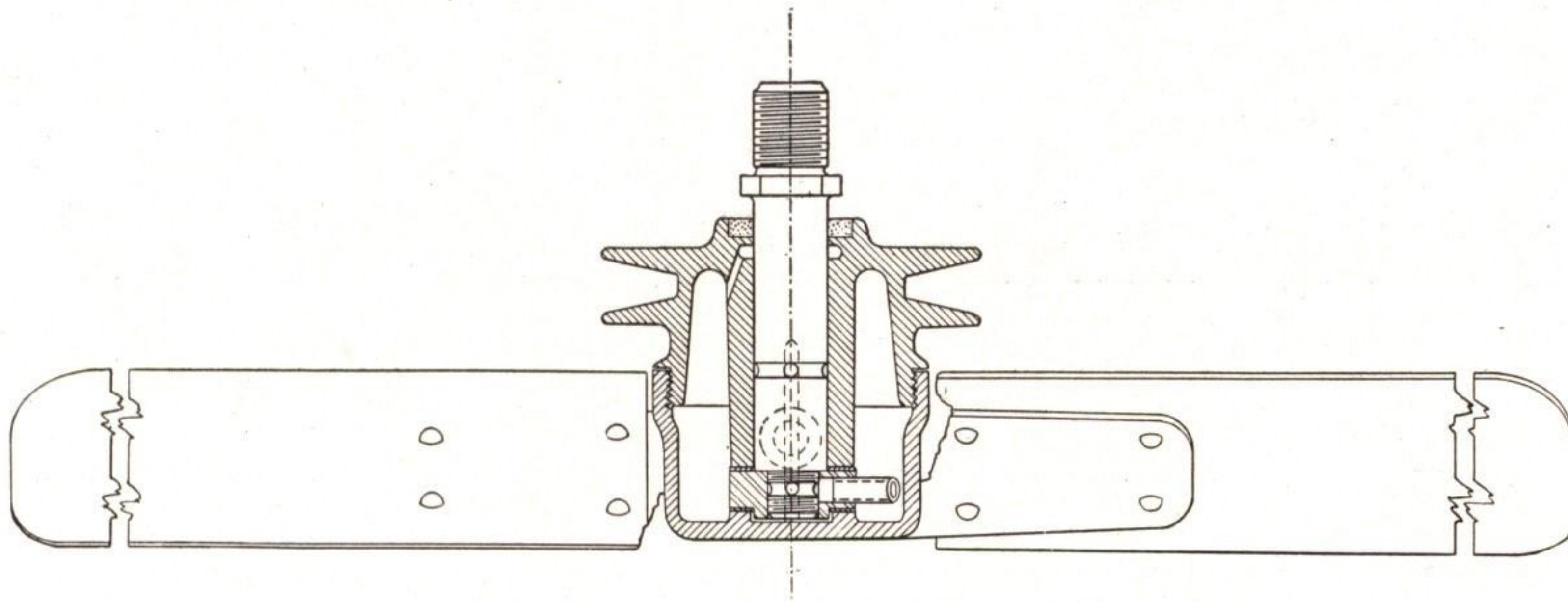
At the end of every 3000 to 4000 miles of travel **drain** all of the lubricant from the transmission and refill with clean, fresh lubricant to the level of the filler plug.

21—Rear Axle

The rear axle should contain enough lubricant to bring it up to the level of the filler plug, found in rear of housing. Replenish the lubricant in the axle every month. Use 600-W, heavy oil.

Caution should be exercised to see that the level of the oil does not come above the filler plug, as too much oil will cause leakage into the axle and finally out onto the wheels.





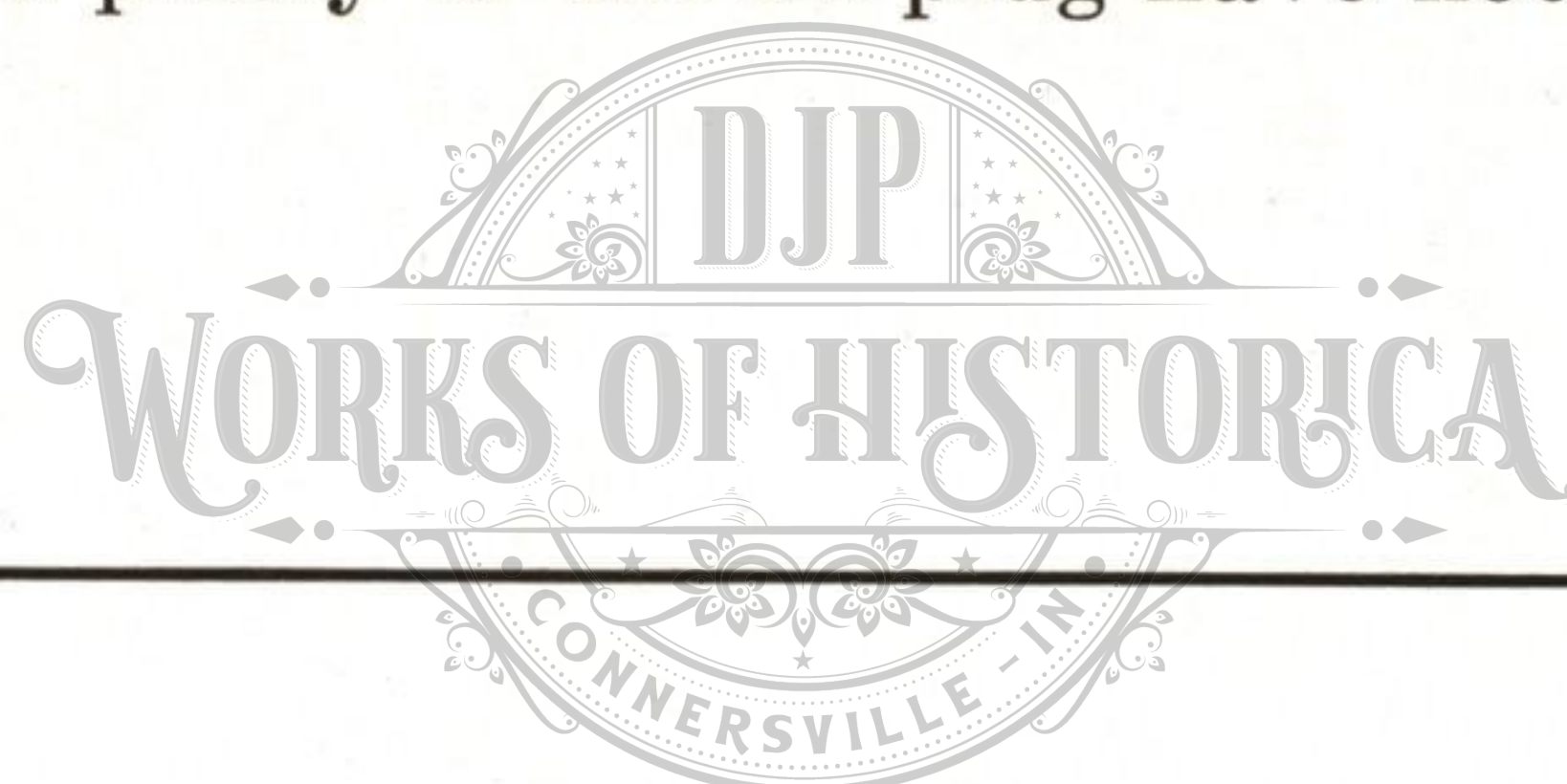
Instructions for Care and Maintenance of Flood-Oiling Fan with which the Lark and other Series "ST" Models are Equipped.

This fan has been found to require the minimum of attention on the part of the user, and tests representing 50,000 miles of motor car travel have failed to show the necessity for additional lubrication, beyond the oil originally put in the fan.

An added precaution, however, would be to drain the oil from the hub once a year and renew with medium engine oil; filling the hub to the level of the bottom of the spindle. If the fan is overfilled with oil, there will be a leakage at the rear of the fan shaft until the oil has attained its proper level.

Should the user see fit to remove the oil plug, be sure that it is replaced tightly in order to avoid the possibility of oil leakage.

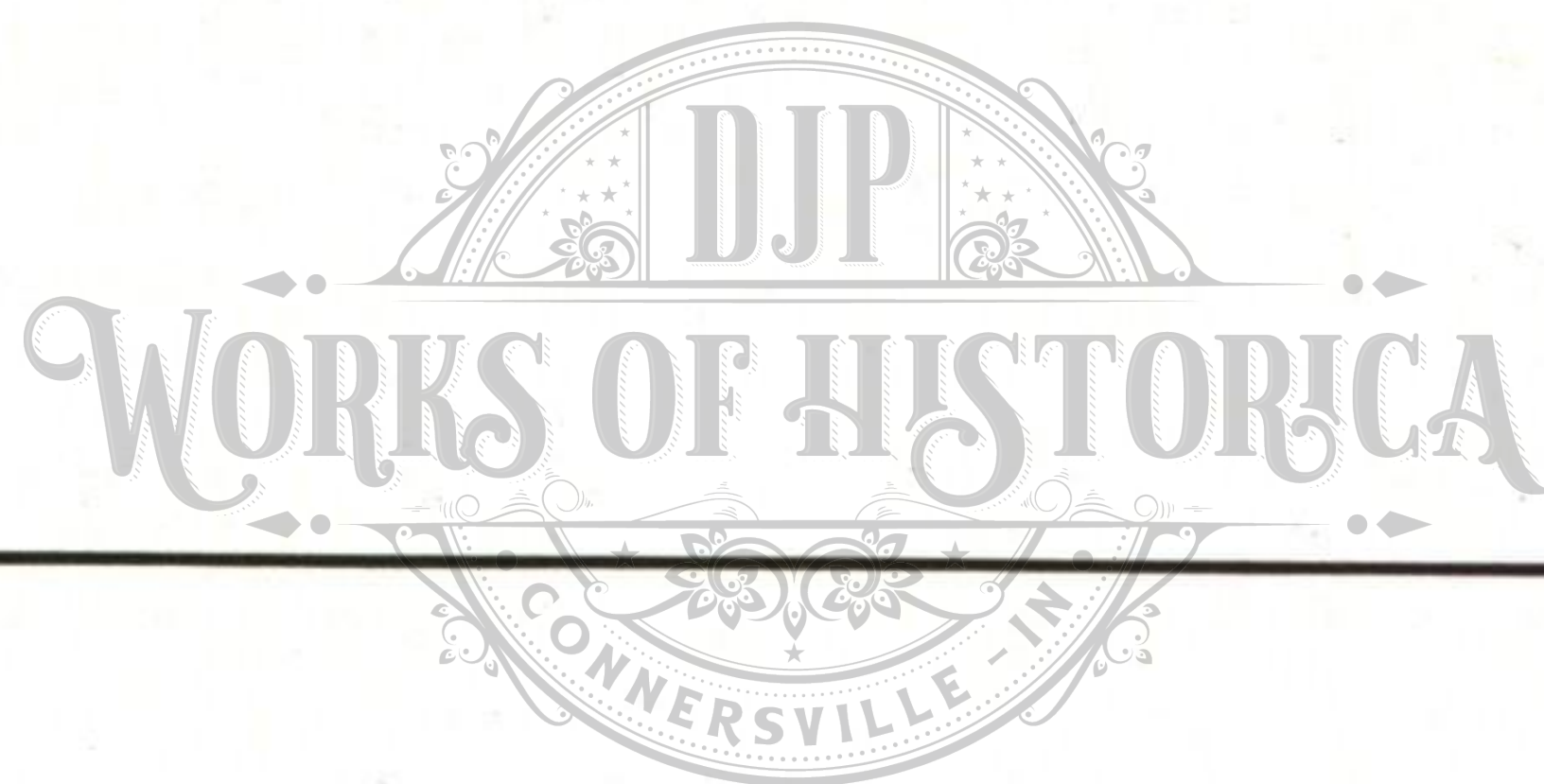
Mechanical troubles are not expected, but should the hub suddenly bind on the spindle, it is a simple matter for the owner to repair. Remove the fan from the motor, and unscrew the hub and blades from the drive pulley, taking off the blade assembly. Take the spindle shaft out of the hub and examine for any small rough spots and dress these down with fine emery cloth. Reassemble the fan and replace oil, as explained above. Be sure to tighten the hub and pulley securely to avoid oil loss. It is a good plan to wipe the fan blades clean after assembling, and examine the back of them after running the fan a few minutes on the motor. If they show streaks of oil, either the hub and pulley or the oil plug have not been securely replaced.



CARE AND ADJUSTMENT

FIVE MINUTES OF IMPROPER HANDLING
WHILE YOUR CAR IS NEW
MAY CAUSE YOU BOTH EXPENSE AND ANNOYANCE.

STUDY THIS SECTION CAREFULLY!



PRECAUTIONS WITH A NEW CAR

Notwithstanding that we lap in, and then work in under power, the engine, transmission, differential, and in fact all moving parts on the Lexington car, and do this under the most advanced and approved methods, nevertheless at least two hundred and fifty miles of road work, under varying conditions, are necessary to "working in" a motor car before it is ready for real strenuous work and high speed.

Therefore, handle your car with considerable care during the first two hundred and fifty miles, and under no circumstances run it at an excessive speed! Twenty-five miles an hour should really be your limit during this time of "working in."

A high speed locomotive offers an excellent comparison. The locomotive is built to run easily and pull a tremendous load at seventy miles an hour. But is that locomotive put at once into such service? Hardly!

The locomotive is run dead in a freight train to its point of delivery. Then it is easily and carefully broken in by being given slow freight service before it is turned over to the passenger crew.

It is a good deal the same in the case of a steamship. The ship is built under contract guaranteeing same to go so many knots per hour, but no ship-building concern would think of submitting a new boat to a trial until after its engine had had ample time to "wear in."

Careful handling of your car when new means a better and smoother engine and fewer repair bills.

The pistons of any new engine will be found snug and tight. This is done to prevent their becoming loose after they have been "run in." For this reason the pistons should be "run in" gradually by not attempting to drive the car over twenty-five miles per hour for the first two hundred and fifty miles of service. Thorough lubrication of the engine during this period is also essential.

TIGHTENING SPRING CLIPS

The springs, like the engine bearings, have to take a sort of set before they are permanently tight. Hence, it is desirable to tighten up the spring clips at the end of the first one hundred miles of running and then inspect them occasionally until they remain tight. (See Plate 3 and Page 26.)

UNIVERSAL JOINTS

All nuts should be tight and cotter-pinned to prevent bolts from working loose. (See Plate 2, Page 23.)

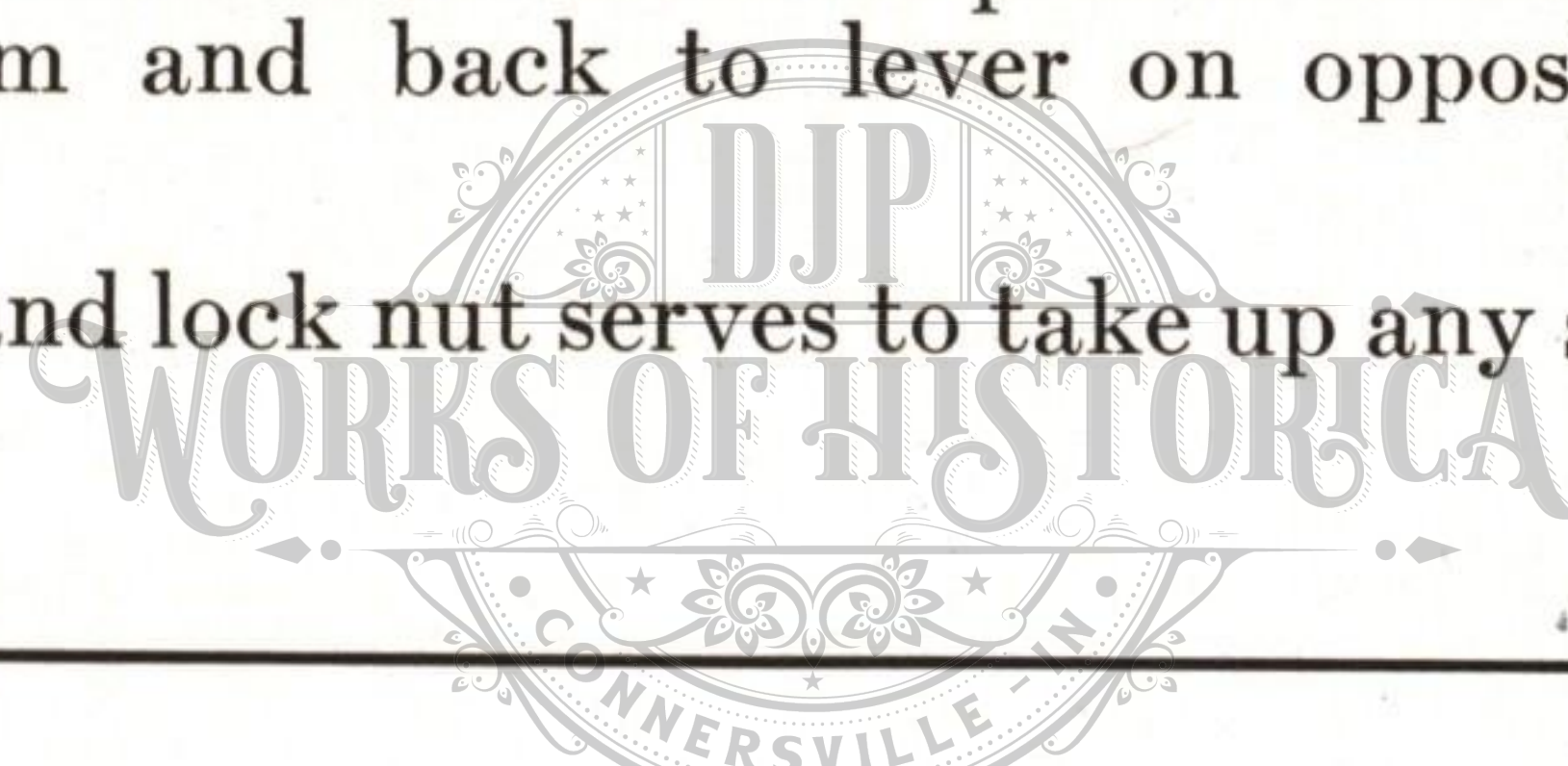
STEERING CONNECTIONS

The steering connections should be gone over occasionally to see that they are all tight. (See Plate 3, Page 25.)

BRAKES

A steel cable connected to one lever passed around a grooved pulley attached to the foot pedal arm and back to lever on opposite drum, making the best form of equalizer.

A simple screw and lock nut serves to take up any slack in cable due to wear of the brake lining.



With any great amount of wear in brake lining, causing too much pedal travel, by setting up the brake lever stop screws at rear drums as close as they will go, without causing the bands to drag, then taking up the slack in cable at pedal end, the brakes can be kept in first-class condition until lining is worn out.

ADJUSTMENT OF SERVICE BRAKES

The adjustment of the service brake is effected by means of the thumb screws on the end of the cable, where cable is fastened on to the bell crank. Loosening the nut toward the front and tightening the one toward the rear takes up on this brake. After the adjustment is made, see that both nuts are tight, so that there may be no slippage.

ADJUSTMENT OF EMERGENCY BRAKE

The emergency brake is very easily adjusted. The adjusting screw has on it, two (2) nuts—loosening the upper and tightening the lower nut takes up the slack on the brake. When proper adjustment is secured, tighten the upper nut so that it locks the lower in place.

TIRES

At the present time the tires are the most expensive item in the maintenance of a car. They are at the same time susceptible to more wear than any other part of the machine. Careful driving is the greatest factor in prolonging their life. It should be borne in mind that all sudden stops and starts, skidding, rapid running over rough roads, and, in fact, careless driving of all kinds, are to be avoided whenever possible.

The trouble attendant upon driving with the tires only partially inflated is also serious. The tire, when run while soft, is heated to an extraordinary degree, causing disintegration of the cords and rubber, breaking down the structure. Always keep the tires inflated to 45 lbs. on front and 65 to 70 lbs. on rear. This precaution should be rigidly observed.

Oil and grease attack rubber and should be immediately removed if any is discovered on the tires.

Keep all oil and gasoline away from your tires; they are solvents of rubber and will cause tires to rot.

When making a stop, select, wherever possible, a dry place for your car to stand upon.

Spare tires should be kept in a place where they are not subject to light, heat, or rapid changes in temperature.

Nothing will wear a tire faster than sudden locking of the rear wheels, and turning corners at considerable speed. Use your brakes with judgment, and turn corners slowly.

When a tire is worn at the tread, or when it develops sand blisters or mud boils, it is best to change it in time and have it re-treaded. This operation will make it available for considerable more service, whereas when allowed to run down too much the carcass of the tire will become so weakened that a re-treading of the casing will prove poor economy.

Never allow a tire to wear until the canvas fabric or cords become injured, because the wall of the tire is apt to become too thin to prevent pressure of the tire from bursting through the weak portion. Remember that the strength of the inner tube is in the fabric or cords. The rubber is merely a binder which unites the various layers of fabric and forms a protecting covering over the whole.

Carry an extra casing. It is so much simpler to change a tire than to repair an old one. Extra casings should be carried in a tire covering securely fastened to car.

Don't pump your tires merely by guess work. Use a tire gauge and make it a point never to carry less pressure than is recommended by the makers.

Always sprinkle some French talc or soapstone into the casing when changing a tube.

Carry a few spare valves and valve caps, also tube patches, etc.

GASOLINE SYSTEM

The gasoline tank is located at the rear of the chassis, where it is not subjected to the intense heat of the engine and where it may be easily filled simply by removing the filler cap. The vacuum gasoline system is used for feeding the gasoline from the tank to the carburetor. This system is not only exceedingly simple, but also aids in still further decreasing the gasoline consumption, as the feed is always at an even and uniform pressure.

The vacuum gasoline system comprises a small tank about 4 inches in diameter and 8 inches deep, mounted on the engine. This tank is divided into two chambers, upper and lower. The upper chamber is connected to the intake manifold, while another pipe connects it with the main gasoline supply tank. The lower chamber is connected with the carburetor.

The intake strokes of the engine create a vacuum in the upper chamber in the tank, and this vacuum, or suction, draws gasoline from the supply tank.

As the gasoline flows into this upper chamber it raises a float. When this float reaches a certain height it automatically shuts off the vacuum valve and opens an atmospheric valve which lets the gasoline flow down into the lower chamber.

The float in the upper chamber drops as the gasoline flows out, and when the float reaches a certain point it in turn reopens the vacuum valve and the process of refilling the upper chamber begins again. The same processes are repeated continuously, and absolutely automatically. The lower chamber is always open to the atmosphere, so that the gasoline flows to the carburetor, as required, uninterruptedly and with an even pressure.

A section thru the vacuum tank is shown in Plate 4 on the opposite page.

The vacuum tank is connected at D with the main gasoline supply tank, also at C with the intake manifold, and at K with the carburetor. A is the suction valve for opening and closing the connection to the manifold and through which a vacuum is extended from the engine manifold to gasoline tank. B is the atmosphere valve and permits or prevents an atmospheric condition in the upper chamber.

E is a lever to which the two coil springs S are attached. This lever is operated by the movement of the float valve G.

F is a shorter lever which is operated by lever E, and which in turn operates the valves A and B.

H is the flapper valve in the outlet T. This flapper valve is held closed by the action of the suction whenever the valve A is open, but it opens when the float valve has closed the vacuum valve A and opened the atmospheric valve B.

I is the vent pipe, admitting an atmospheric condition in lower chamber at all times and permitting an even, uninterrupted flow of gasoline to carburetor.

R is a screen for preventing dirt being drawn into the tank through the atmospheric valve.

T is the outlet in which is the flapper valve H and located at the bottom of the float reservoir. It can be unscrewed with a screw driver (see slot U) and removed if desired.

It is very important to keep vent in cap open in rear supply tank.

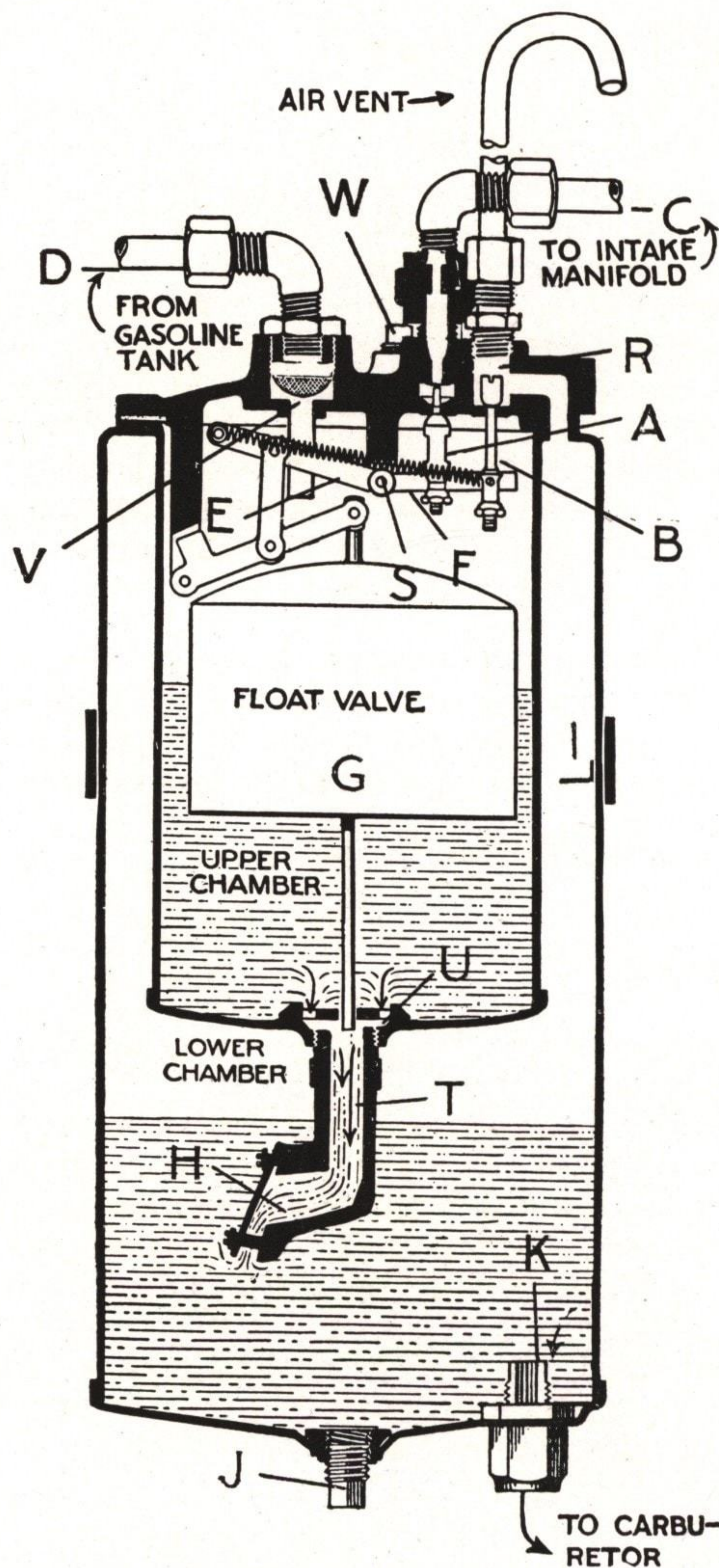


PLATE 4—Section of Vacuum Tank

AMMETER

The amount of charge into or discharge from battery (except starting current) is, at all times, shown on the ammeter, mounted on instrument board. The ammeter (the tell-tale of the electric system) should be observed occasionally at different speeds until you are familiar with the workings of the electric system. The hand should stand at zero at all times when motor is not running and lamps are turned off. If the hand shows discharge it indicates an electrical leak in wiring and should immediately be looked after.

With motor running slowly and the car in high gear, hand will point to zero. But slightly increasing speed of motor, hand should begin to show charge and should show a maximum charge at sixteen to eighteen M. P. H. of about 15 amperes. When all lamps are turned on at this speed (the lamp load being 8 amperes) the hand should drop back to about 7 amperes indicating that generator is carrying full lamp load and charging battery at 7-ampere rate.

RADIATOR COOLING SYSTEM

If the radiator be kept full of clean water at all times there will never be any trouble experienced from over-heating due to the circulation system. The water passages in the jacket surrounding the cylinders are unusually large. Rain water should be used by all means if available. Any well water contains more or less lime and mineral compounds in solution that leaves a scale or sediment inside the radiator and jacket which greatly hinders the free transmission of the heat from the cylinder walls to the water. If such water must be used the entire cooling system should be cleaned at frequent intervals by mixing up a solution of one pound of ordinary washing soda to about five gallons of water and allowing the solution to remain in the system for about an hour, and then flush out thoroughly. It is just as important that the external surfaces of the radiator be kept clean. A quick adjusting device is provided to keep the fan belt tight. Keep the belt just tight enough to prevent the belt from slipping.

When the first freezing weather comes, the greatest care should be exercised to prevent the freezing and bursting of any part of the cooling system. The water may be drained out entirely when the engine is stopped, or better, a solution of some sort used that will not freeze at ordinary temperatures.

See "Cold Weather Suggestions," page 16.

LUBRICATING SYSTEM

The life of an engine depends upon its lubrication. The new lubricating system used upon the Ansted Engine is the latest and most perfect known to engineers. It is the full pressure feed type. The oil is forced through the hollow crankshaft. As all the oil passes through the shaft it acts as a coolant just as the water in the cooling system which is circulated around the cylinders. It removes the heat from the crankshaft bearings just as the water does from the cylinders. The oil is circulated by a gear pump that is located in an accessible position on the left side of the crankcase. The supply of oil is carried in the bottom half of the crankcase, and the level may be ascertained by a blade type of oil level gauge. This is positive, whereas an indicating gauge may stick and the engine run out of oil before the driver knows it.

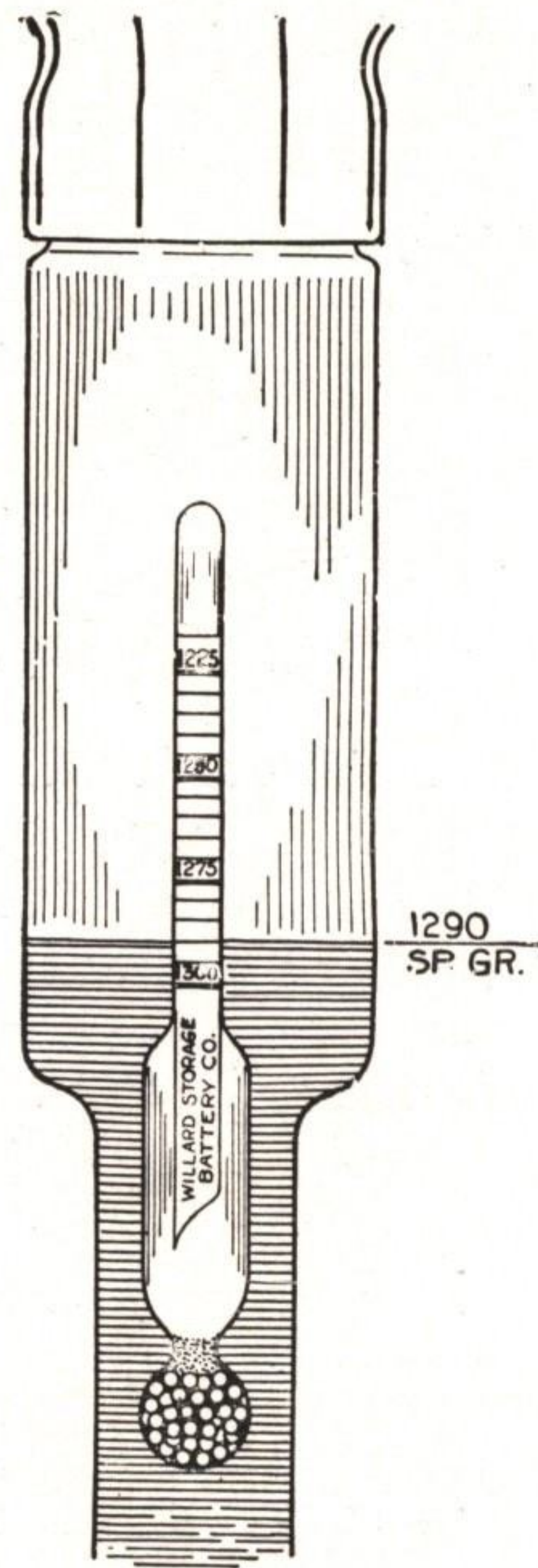
BATTERY

Battery must be looked after at regular intervals (once a week in summer).

A few points in regard to the care of the battery should be borne in mind. Keep the battery securely fastened in place. Pure water must be added regularly to all cells and at sufficiently frequent intervals to keep the solution level with the inside cover. Never allow the solution to get below the tops of the plates. Remove vent plug to pour in water and then screw on after filling. Use nothing but distilled water.

A—Storage battery ground wire, should *always* be disconnected before any electrical connections are broken, so that there will be no chance for a loose wire coming in contact with some part of the engine or frame and completing the electrical circuit, thus short-circuiting and discharging the battery.

The best way to ascertain the condition of the battery is to test the specific gravity, or density, of the solution in each cell with a hydrometer at regular intervals. When all cells are in good order the gravity will test about the same in each. When fully charged, the readings will range from 1.280 to 1.300. Above 1.200



Reading for fully charged battery
should be between 1.280 & 1.300

PLATE 5—Section of Hydrometer

indicates that the battery is more than half charged. Below 1.200 and above 1.150 indicates battery is less than half charged. Gravity below 1.150 shows that the battery is completely discharged. If the battery should be found to be as low as 1.200 at any time, use the current sparingly until the gravity is restored to at least 1.250. Putting acid or electrolyte into the cells to bring up the specific gravity can do no good and may do great harm. A full charge is the only recourse to be had in bringing the battery back to normal condition. If for any reason an extra charge should be needed, it may be accomplished by running the engine idle. However, there should be no occasion for extra charging of this nature if the current is not unduly wasted. (Section of hydrometer shown above.)

A battery that is to stand idle for any length of time needs charging as much as one in active service. It may be kept in good condition by giving it a freshening charge by allowing the engine to run at least once a month. It should be given a thorough charge before it is put into active use again. In order to avoid freezing of the battery, it should be kept in a fully charged condition. The electrolyte will freeze as follows:

Sp. gr. 1.120, battery discharged, 20 degrees above zero.

Sp. gr. 1.160, battery three-fourths discharged, zero.

Sp. gr. 1.201, battery one-half discharged, 20 degrees below zero.

Sp. gr. 1.260, battery one-fourth discharged, 60 degrees below zero.

Should the storage battery be removed at any time from the car, do not start motor, as you may ruin generator.

The Willard Storage Battery Company, of Cleveland, Ohio, maintains a large number of service stations for the benefit of the owner who has a Willard Storage Battery. As soon as you get your car, it would be well for you to get in touch with the nearest station.

FUSES

We have provided a set of fuses, mounted on left side of dash, under hood, for the several wires leading to lamps. In case of short circuits or trouble to lamps these will blow and save the battery from injury. Before replacing fuse (extras should be carried at all times) ascertain the trouble.

Capacity of Fuses—The capacity of fuses in each circuit should be as follows: Head lights, 15 amperes; tail lamp, 5 amperes.

STARTING SWITCH

Do not put oil on any part of the starting switch. In the switch for automatic pinion shift, the moving contact should close firmly against the stationary contacts, and the return spring in the switch should open the contacts at least $\frac{1}{8}$ -inch when pressure is removed.

STARTING MOTOR

When the starting switch is closed, the full battery voltage is impressed on the motor, and it starts immediately. The pinion, when the motor is at rest, is within the screw-shift housing and entirely away from the flywheel gear. The threaded shaft is connected to the motor shaft by a spring which thus forms a flexible coupling. As the load is not large enough to compress the spring when the motor starts, the threaded shaft is immediately revolved by the spring in released position. The pinion moves out on its shaft by virtue of the revolving threads, until it reaches the flywheel. If the teeth of the pinion and flywheel meet instead of meshing the spring allows the pinion to revolve until it meshes with the flywheel. When the pinion is fully meshed into the flywheel teeth, the spring compresses and the pinion is then revolved by the motor as through a continuous shaft, turning the engine over. When the engine fires, and the flywheel peripheral speed continuously exceeds that of the driving pinion, it forces the latter out of mesh and it is returned to its original position in the screw-shaft housing. During the periods immediately after the engine has passed over any one of the points of maximum compression, the spring offers an elastic cushion between the flywheel and the reduction gear so that the pinion will not be thrown out of mesh.

The starting motor will run the car (preferably on lower gear) a short distance in an emergency. However, the battery is not intended for this purpose and if so used will deteriorate rapidly, especially if allowed to stand without being at once fully recharged to gassing.

The motor has ball oilers; each of the oilers should be given three to four drops of the best grade of machine oil once every month.

Examine the commutator occasionally by removing the spring collar over the brushes. Keep the commutator free from dirt or oil, cleaning, when dirty, with a cloth (not waste.) When the commutator and brushes are in good condition they will show a glaze, and the commutator will be chocolate brown in color. If rough, they can be smoothed up with fine sandpaper, but do not use emery paper.

The brushes should not be removed except in case of trouble. To remove brushes, lift the spring that holds the brush in the guide and take out the screw holding the brush, then the brush can be slipped out. In removing each brush it should be remembered which side was turned up, and each brush should be replaced in its original holder with the proper side up. In putting in new brushes, care should be taken to see that they have a good bearing-fit on the commutator. The original brushes are long enough to last almost indefinitely.

If for any reason a bearing has to be removed and replaced, the adjusting cover plate should be screwed in to exactly the same position and the stop inserted in the same hole as originally.

Surprisingly few troubles have been experienced with the Gray & Davis starting system; and of the troubles that have occurred, by far the greater part have not been due to the electric system, but to failure of gasoline, carbonized spark plugs, etc. When trouble does arise it is desirable to locate it as quickly as possible. To assist in doing this we give below the troubles that could occur with this system, and the possible causes of each, although very few of these troubles will ever be experienced. In locating the cause of the trouble, check up the various points in the order given, as the most likely cause, and the one most easily tested, is given first.

If starting motor fails to start at all when starting button is pressed down as far as it will go, test out the trouble as follows:

(a) Battery run down or battery solution low. Fill with distilled water and recharge.

(a-1) Battery defective. This is probable if battery has been operated for considerable periods in nearly discharged condition or with plates exposed above the solution. Battery should be repaired.

(a-2) Loose, rusty, or corroded connections at the battery terminals or battery ground connections.

(a-3) Accidental ground at brush shunts, or motor, or switch terminals.

(b) Examine the starting switch to see that connections have not worked loose in such a way that the switch does not operate.

(b-1) Look for a broken wire or loose connection in the circuit from battery to starting switch; from switch to starting motor; from motor to ground; from battery to ground.

(b-2) Remove spring collar over the brushes; see that the brushes and commutator are in good condition and not sticky with oil, and that brushes are making contact with commutator.

If motor rotates but engine does not, the pinion may fit too tight on its shaft, the threads may be clogged, or the pinion shift spring may be broken.

If motor rotates until the pinion meshes with the fly wheel and then it stops rotating, the engine or some of its auxiliary parts may not be moving freely, due to improper lubrication, etc., or the battery may be discharged.

If the engine does not pick up immediately after two or three trials, though the motor turns the engine over, the trouble is in

- (a) The gasoline supply.
- (b) The spark plugs.
- (c) The carburetor.
- (d) The ignition system.

(See page 17 also.)

If starting motor continues to run after the switch lever is released, see that the return spring on the switch or switch lever is strong enough to return the parts positively and fully to the "open" position.

ELECTRIC GENERATOR

The generator which supplies electric current for the storage battery and the lights is driven from the engine. While the engine is not running, or is running at very low speed, the lights are supplied entirely by the battery. At a predetermined speed the generator circuit is "cut-in" on the battery circuit and the generator supplies some of the current used by the lights, or begins charging the battery if the lights are not turned on.

LIGHTING GENERATOR AND REGULATOR

Generator output is controlled by third brush regulation. A single-wire system is used.

Generator should cut-in on the line around seven or eight miles per hour car speed.

Should balance lamp load of eight amperes at about twelve M. P. H. and show a maximum charge of fifteen amperes at sixteen to eighteen M. P. H. car speed when lights are off.

A slight reduction in charge rate when generator is hot will be noted.

The temperature of the generator should not exceed 175 degrees Fahrenheit.

Position of third brush can be changed by a screw driver, through a rack and pinion adjusting device at rear of generator. The shaft extends through with screw driver slot.

Charging rate should never be set to exceed 15 amperes at any speed.

This can be done with generator running by noting the ammeter reading.

The generator described is of the automatic type, the regulator being mounted integral with the generator at rear end.

Cut-out—When the generator is being operated at a speed below the predetermined "cut-in speed," the contacts of the cut-out armature are open, the voltage of the generator being below that of the battery. When the generator speed reaches the "cut-in speed," these contacts are closed, connecting the generator circuit to the battery circuit. The "cut-in speed" varies from five to ten miles per hour on high gear.

Regulation of Charge—If the battery tends to run down, the car should be operated a larger portion of the time without lights, or with fewer lights, until the charge is increased. It should be borne in mind that when the engine is not running no charge is going into the battery. On the other hand, if the lights are on, and the engine is idle, the battery is being discharged. In order to reduce the drain on the battery it is well to turn off as many of the lights as possible when the engine is idle.

Indications of Discharged Battery—If the specific gravity drops to 1.100 or 1.150, it indicates that the battery is discharged.

Indication of Correct Solution—When the battery is fully charged and gassing freely the specific gravity should be between 1.275 and 1.300. If materially higher, a little distilled water should be added; if materially lower, add a very little chemically-pure sulphuric acid. The addition of acid should be done in the manner outlined in the battery instructions. In general, however, water only will be required. (See "Battery," Page 33.)

Oiling—The oil cup at each end of the generator should be given three or four drops of oil about twice every month, or every 500 miles of driving the car. This is very important. Use only the best quality of machine or engine oil.

Brushes—In general the wear on the brushes is so slight that they will outlast the car. They should not be disturbed except in case of trouble. These are removed by unscrewing the thumb-screw caps over them, when the brush and spring will come out together. In removing each brush it should be noticed which side was turned up and each brush should be replaced in its original holder with the proper side up, taking care to see that the brush is resting against the commutator. The adjustment of the spring should be such that there is at least $\frac{1}{2}$ -inch compression on it when the cap is screwed tight. In putting in new brushes care should be taken to see that they have a good bearing-fit over their entire surface on the commutator, grinding them in until this fit is obtained. To obtain satisfactory operation, always use brushes furnished by the manufacturer.

The generator described is of the automatic type, the regulator being mounted integral with the generator at rear end.

LIGHTING SWITCH

The connections of the various lights to the circuit are accomplished through the use of the lighting switch. Pulling down lever on the left side gives all lights bright. Pulling down first lever to left gives all lights, with headlights dim. Pushing up both levers, all lights off. (See page 54.)

CARBURETOR ADJUSTMENTS

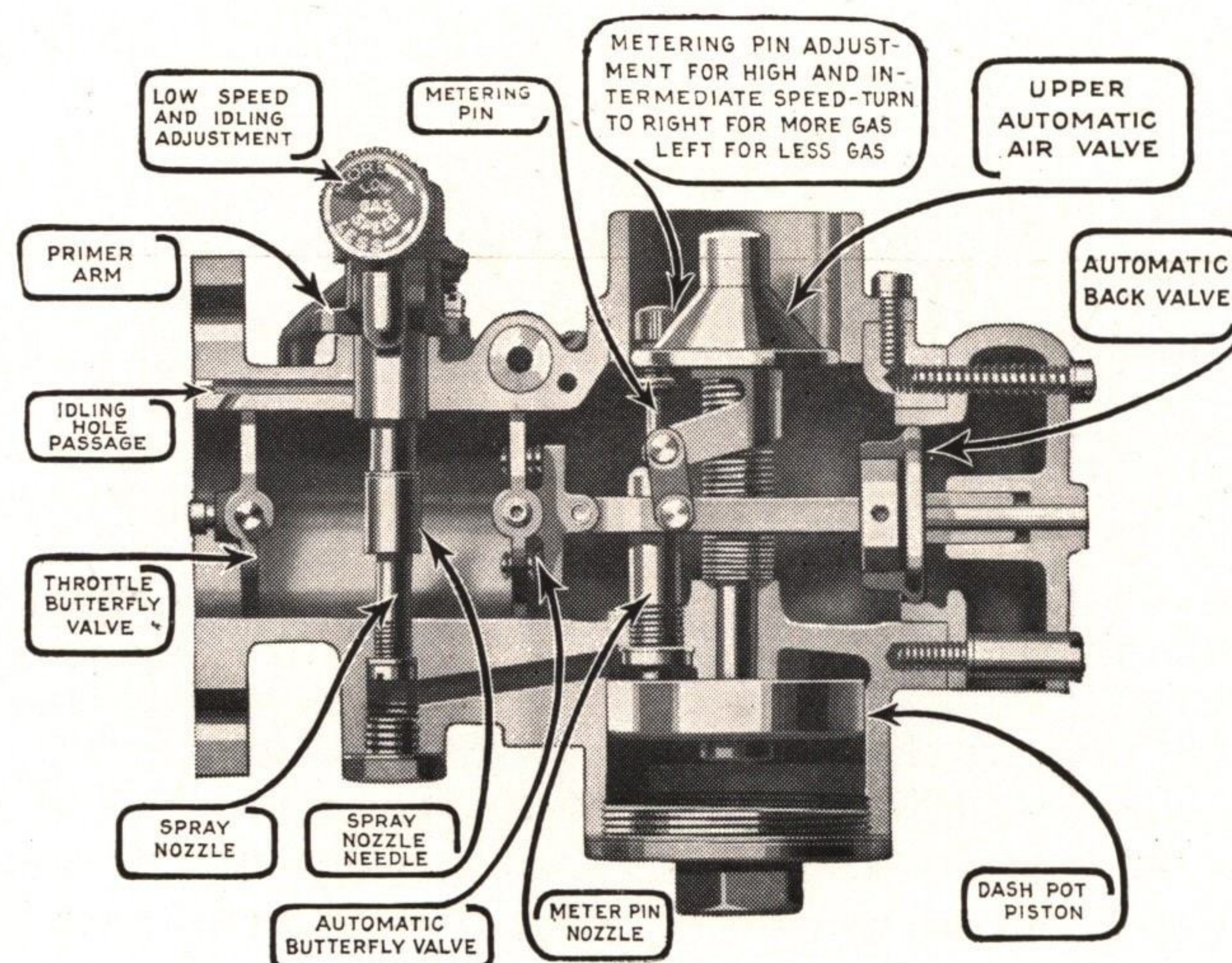


PLATE 6—Section thru Carburetor with Parts Named and Indicated

LOCATION OF TROUBLE IN ELECTRICAL SYSTEM

When trouble arises it is desirable to locate it as quickly as possible. To assist in doing this we give below practically all the troubles that could occur with this system, and the possible causes of each, although very few of these troubles will ever be experienced. In locating the cause of the trouble, check up the various points in the order given, as the most likely cause, and the one most easily tested, is given first.

Lamps in One Circuit Do Not Burn—This may be caused by:—

- (a) The lamp is burnt out. Try another lamp in the same socket.
- (b) Blown fuse in that circuit. Try the same fuse in another circuit. If the fuse is blown do not replace it immediately, but look over the wiring for an accidental ground or short circuit. In looking for grounds an abrasion of the insulation on the wire or a mechanical contact between the ends of cables or conduits carrying part of the wiring devices and the metal of the car, socket, shells, etc., should be especially looked for. When the trouble has been located and corrected replace the blown fuse with another of the same capacity. If the trouble cannot be located immediately, turn off the switch on the damaged circuit until the trouble has been located. If the trouble is in a particular lamp socket, disconnect the attachment plug from this socket until the trouble can be removed and see that the removed attachment plug does not touch the car frame in such a way as to make a short circuit.

(c) An open circuit, or broken or loose connection in the wiring. Examine the places where the connections are made on that particular circuit.

None of the Lamps will Burn—

- (a) Terminals of the battery are disconnected or corroded so that they do not make good contact.
- (b) Ground wire from the battery to the chassis is disconnected or broken.
- (c-1) Wire from battery terminal to the fuse box disconnected or broken.
- (d-1) The lamps are burnt out.
- (e-1) Battery is run down.

Lamps Go out for an Instant Only—If the lamps in one circuit act this way there is probably a loose connection on the circuit so affected. If all the lamps go out for an instant there is probably a loose connection at one end of the wire from the battery to the fuse box.

Lamps Become Dim When Engine Stops—This indicates a discharged battery. If possible, have the battery charged at once from an outside source. If this cannot be done, endeavor to run with fewer lamps than normal turned on for a few days or until the battery voltage picks up again.

The Battery Does Not Stay Charged—This may be due to any of the following—

(a) The car is not run enough without lights, or at a high enough speed, for the generator to charge the battery and replace the current that is taken from the battery when the lamps are burning with the engine idle or running at very low speed.

(b) A Ground in the Car Wiring—With the engine idle and all switches “off” note if ammeter shows discharge. If so, there is a ground in the wiring between the battery, the generator, and the switch, or the magnetic switch of the regulator is not open.

(c) Regulator Cut-out Switch is not Operating Properly—Examine the switch and see that it is properly connecting and disconnecting the generator circuit. The switch should be in the open position when the engine is not running,

or should stay in the closed position when the engine is running above "cut-in speed." If the switch does not close there may be oil on brushes or commutator, or one of the brushes may be worn too short.

REPAIRS TO ELECTRICAL SYSTEM

Repairs and Responsibility Therefor—In case any difficulty arises that cannot be readily located, notify the Dealer from whom the car was purchased or an authorized representative for the make of the car. The Gray & Davis Co. will not assume responsibility for repairs attempted by unauthorized parties, or assume any guarantee obligation for the upkeep of any apparatus or parts supplied by the automobile owner or unauthorized parties. In case the Dealer is unable to correct a difficulty which he assumes is due in the fault of the Gray & Davis equipment, he will request help from their Service Department.

In ordering repair parts always give all information on the name plate, as this identifies the generator and all its parts completely.

Do not remove the name plate, as the information stamped on it is necessary in ordering repair parts.

In the preceding instructions and description certain electrical terms are used and are explained herewith:

(a) **Conductor**—A conductor is anything that readily carries electric current. In the Gray & Davis system the conductors are copper wire, carbon brushes, tungsten filament of the lamps, car frame, etc.

(b) **Ground**—When any wire or cable leading to the negative (—) battery terminal accidentally comes into metallic contact with any part of the car frame, to which the positive (+) terminal of the battery is connected, a "ground" results. In a single-wire system a "ground" is also a "short circuit."

(c) **Grounded**—The positive (+) battery terminal and one terminal of all other units are electrically connected to the car frame and are said to be "grounded."

(d) **Insulator**—Material that does not carry current readily is called an "insulator." In electrical equipment of automobiles, wood, micarta, rubber, cotton, etc., are "insulators."

(e) **Insulated**—When one conductor is separated from another conductor by an insulator they are insulated from each other. In the single-wire system the conductors connected to the negative (—) terminal of the battery are insulated from the car frame.

(f) **Live**—The parts connected to the negative (—), or insulated, battery terminal are referred to as "live."

(g) **Open Circuit**—If a conductor is broken, or if it becomes loosened from its connection, the electrical circuit is open and no current can pass.

(h) **Short Circuit**—A "short circuit" is a direct electrical connection between two points of opposite polarity; positive (+) and negative (—). For instance, the battery is short circuited when a conductor touches both the positive (+) and negative (—) terminals, or if any point in the circuit leading directly to the one terminal of the battery is brought into metallic contact with a circuit leading directly to the other terminal.

A "short circuit" is extremely destructive to the electrical equipment, particularly to the battery, and should be carefully guarded against at all times.

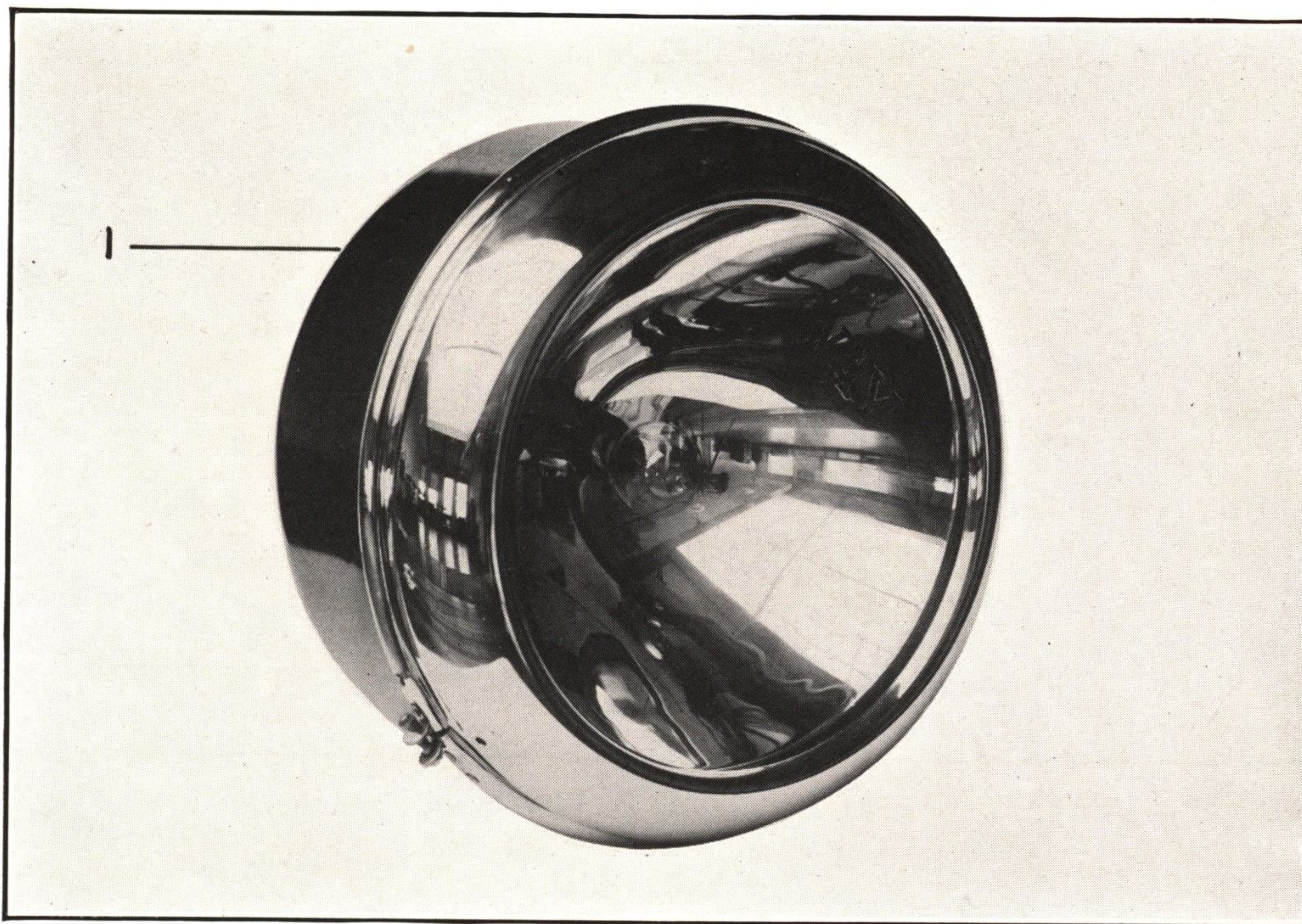


PLATE 7—2-Way Head Lamp Complete.

Parts shown on this plate, their names and part numbers:

- 1—2-Way Head Lamp assembly complete.....(L-456)

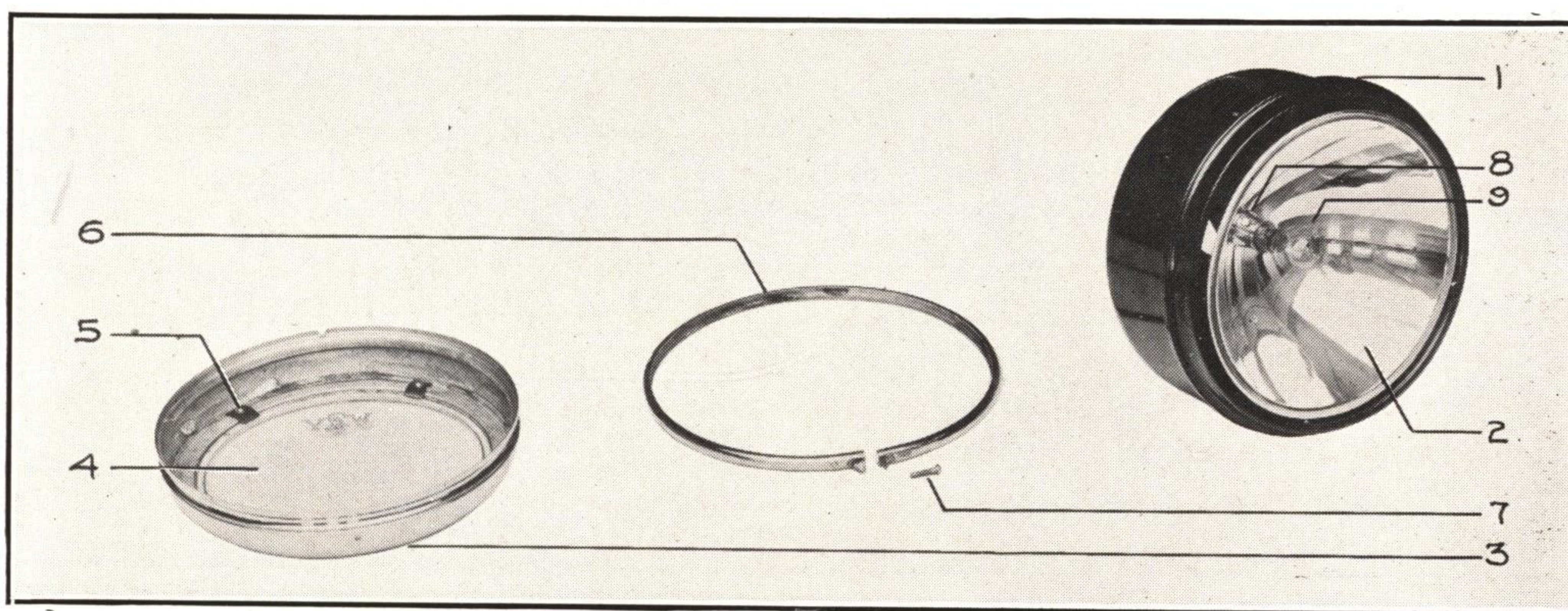


PLATE 8—2-Way Head Lamp Door Removed.

Parts shown on this plate, their names and part numbers:

- | | |
|---|--|
| 1—2-Way Head Lamp assembly complete.....(L-456) | 5—2-Way Head Lamp glass retaining clip.....(L-480) |
| 2—2-Way Head Lamp reflector.....(L-466) | 6—2-Way Head Lamp door ring.....(L-467) |
| 3—2-Way Head Lamp door.....(L-465) | 7—2-Way Head Lamp ring clamp screw (SP-1517) |
| 4—2-Way Head Lamp glass.....(L-472) | 8—2-Way Head Lamp focusing socket.....(L-474) |

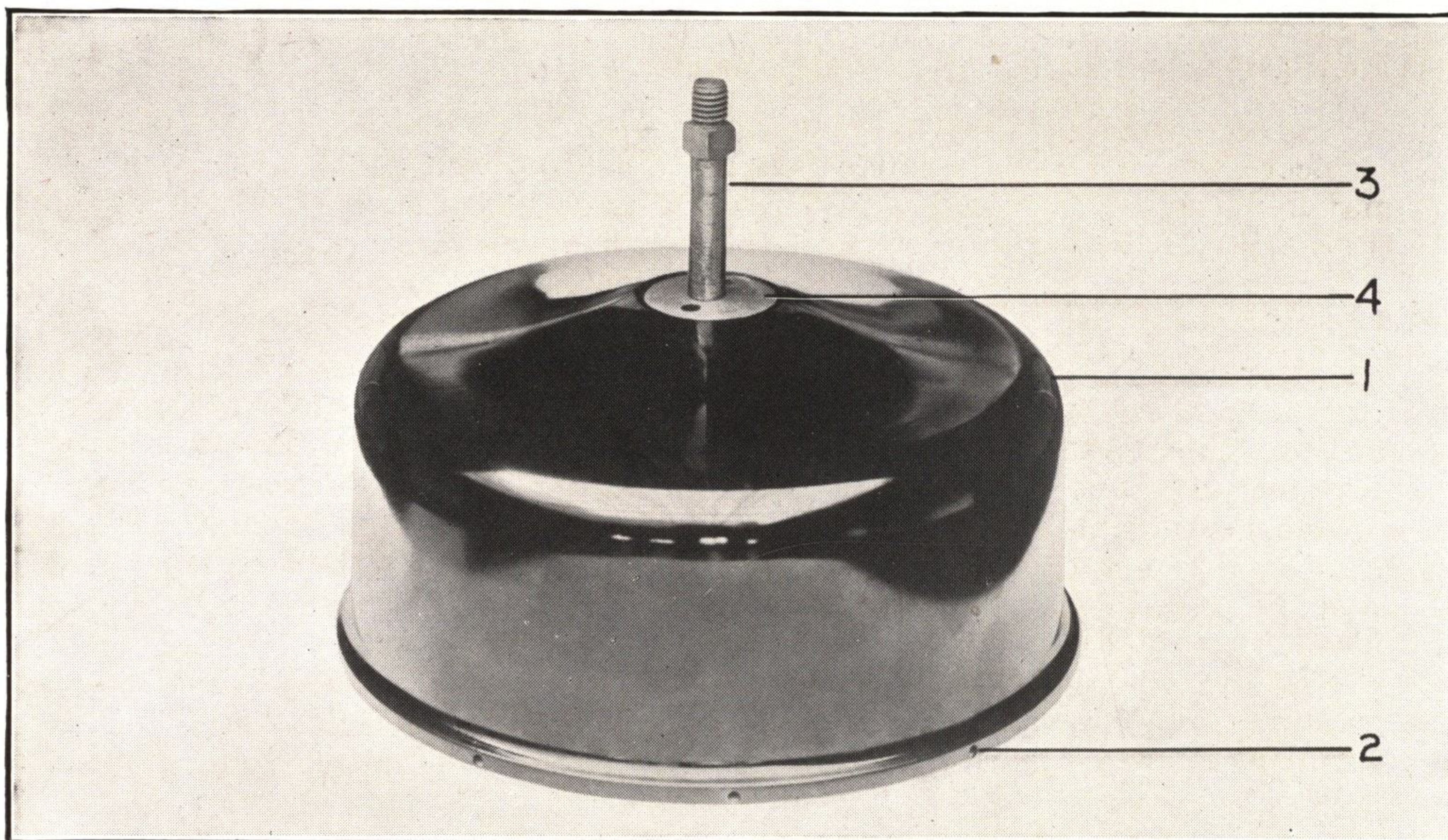


PLATE 9—View of Back of 2-Way Head Lamp Body.

Parts shown on this plate, their names and part numbers:

1—2-Way Head Lamp body.....(L-464) 3—2-Way Head Lamp clamping bolt assembly(L-423-A)

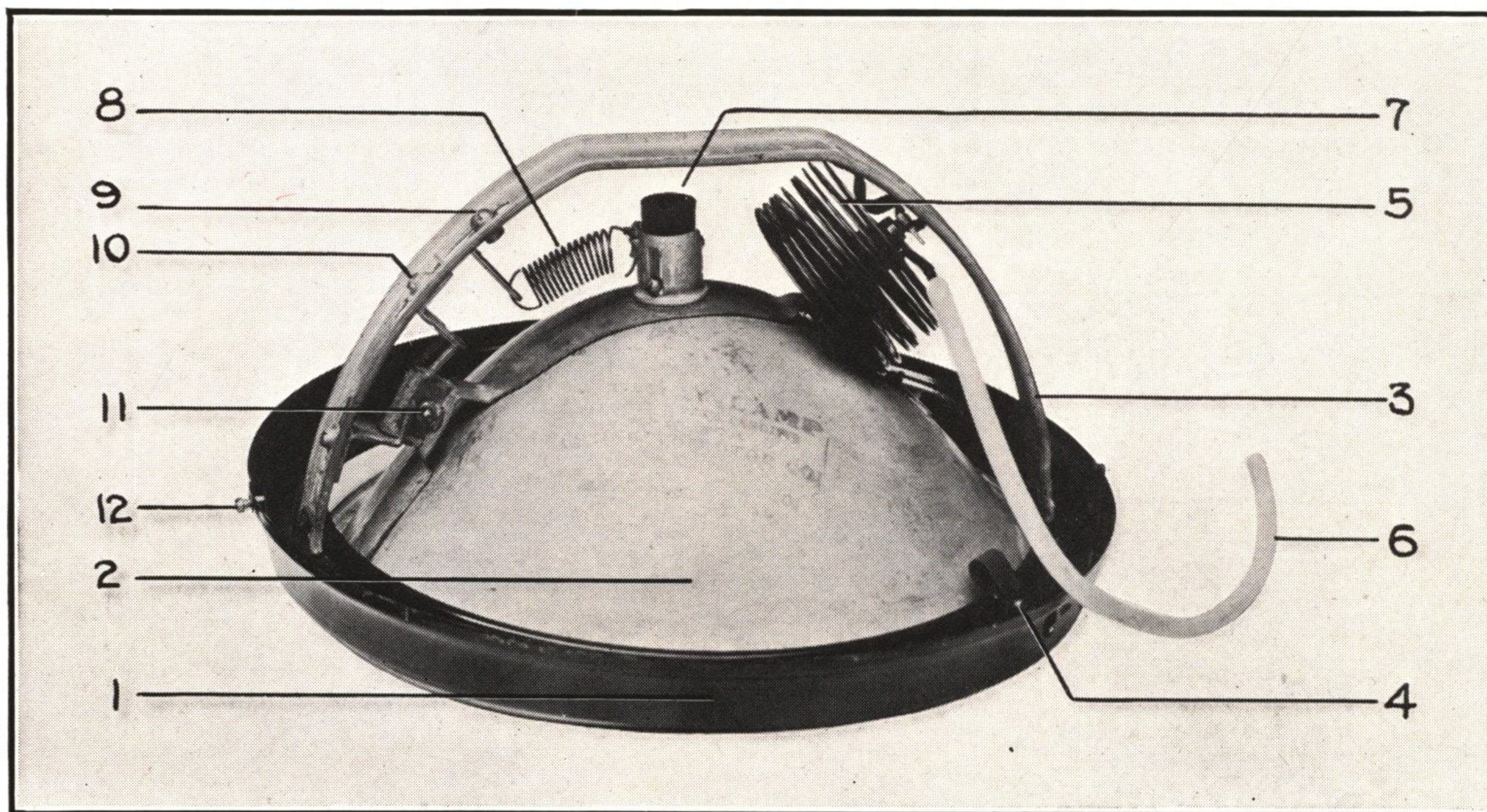


PLATE 10—Construction of 2-Way Head Lamp Tilting Mechanism.

Parts shown on this plate, their names and part numbers:

1—2-Way Head Lamp reflector retainer(L-490)	9—2-Way Head Lamp coil spring bracket
2—2-Way Head Lamp reflector.....(L-466)	screws.....(L-487)
3—2-Way Head Lamp ring arch.....(L-468)	10—2-Way Head Lamp bumper stop
4—2-Way Head Lamp reflector	bracket screws.....(L-482)
retaining spring clip.....(L-469)	11—2-Way Head Lamp bumper retaining
5—2-Way Head Lamp bellows.....(L-476)	screw and nut.....(L-484)
6—2-Way Head Lamp vacuum tube.....(L-413)	12—2-Way Head Lamp reflector ring
7—2-Way Head Lamp focusing socket (L-474)	retaining screw.....(L-486)
8—2-Way Head Lamp reflector coil	
spring.....(L-470)	

PRECAUTION IN WASHING THE ENGINE

Before washing the engine with gasoline or kerosene, be sure to first disconnect the negative (—) battery terminal before beginning. Otherwise a spark may be produced between some "live" part and grounded part, which may ignite the gasoline. Reconnect the battery when danger of igniting fumes is past.

2-WAY HEAD LAMP SYSTEM

(See also, pages 41, 42.)

The operation of the reflectors is controlled by a small three-way valve located on the instrument board, the partial vacuum created in the motor by the suction stroke of the piston being utilized to exhaust the air from the metal bellows connected to the reflectors when it is desired to illuminate the road for a long distance. To accomplish this the handle of the valve is turned to the letter H on the dial. When it is desired to lower the reflectors to their tilted, or normal, position the handle is turned to the letter L on the dial which breaks the communication of the bellows with the motor and allows air to enter the bellows through a port in the valve.

A check valve is placed in the vacuum line between the three-way valve and engine to prevent a quick change to tilted position when throttle is opened quickly.

A cut-off valve is provided to render the system inoperative from driver's seat when necessary.

If system should become inoperative at any time it may be caused by a break in the line, a leaky connection, a break in the rubber tube connection to bellows, or the three-way valve may have become dry, permitting air to leak in, destroying the vacuum.

The three-way valve may be taken apart for inspection and lubrication. Care must be used in reassembling not to disarrange any of the parts.

Use a small amount of commercial vaseline for lubrication.

CARBON DEPOSIT

Should too much oil be poured into the crankcase, or too rich a mixture of gasoline be used, there is the possibility of a coating of carbon collecting over the upper part of the inside of the cylinders and on the tops of the pistons. This carbon would collect exactly the same as it does on a lamp chimney when the flame is turned too high. Should the oil level be kept too high, the excess of oil would work up on the cylinders, past the rings of the pistons, and into the space above the pistons where the explosions take place. Here the oil would partly burn and leave the soft carbon.

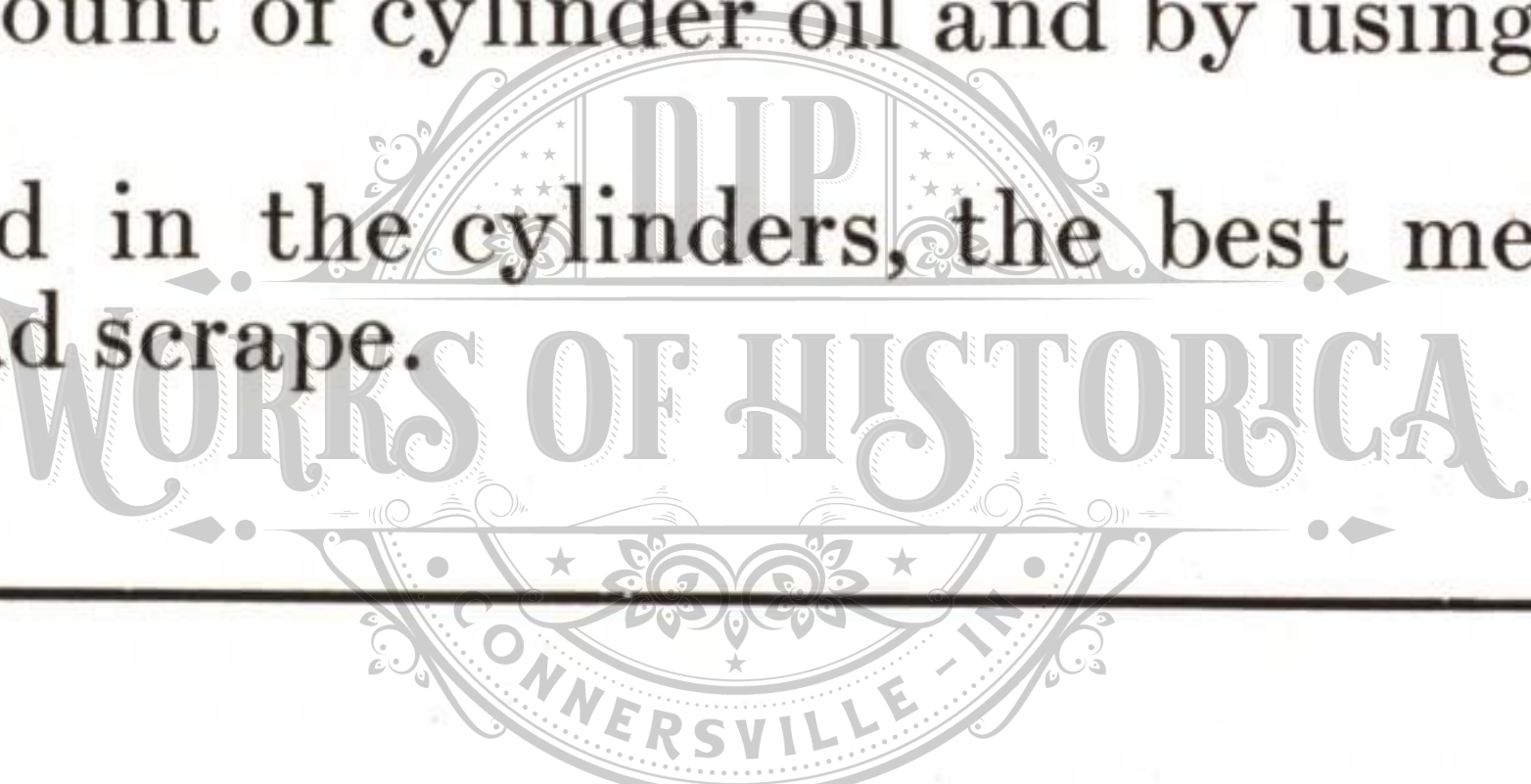
The heat resulting from the explosions would tend to harden the carbon and produce a scale. Too rich a gasoline mixture will cause a deposit of carbon in the cylinders as quickly as the use of too much oil, since the amount of gasoline that can be mixed with air to form a mixture that will burn up entirely is limited.

When the carbon collects to any extent it may heat up, and any tiny projection may become hot enough to set the incoming gas on fire, with the result that the explosion will come too soon. Such a condition will be indicated by a pounding noise, and generally, by overheating the engine.

The engine will also begin to miss in certain cylinders on account of the carbon collecting on the spark plugs and forming a path for the current, which would prevent the occurrence of a spark. The scales of carbon will often become lodged under the exhaust valve and cause loss of compression. The engine will show a noticeable loss of power.

The best remedy for removing this carbon is, of course, the preventing of its formation by using the proper amount of cylinder oil and by using as thin a mixture of gasoline as possible at all times.

Once carbon is deposited in the cylinders, the best means of removing it is to remove the cylinder heads and scrape.



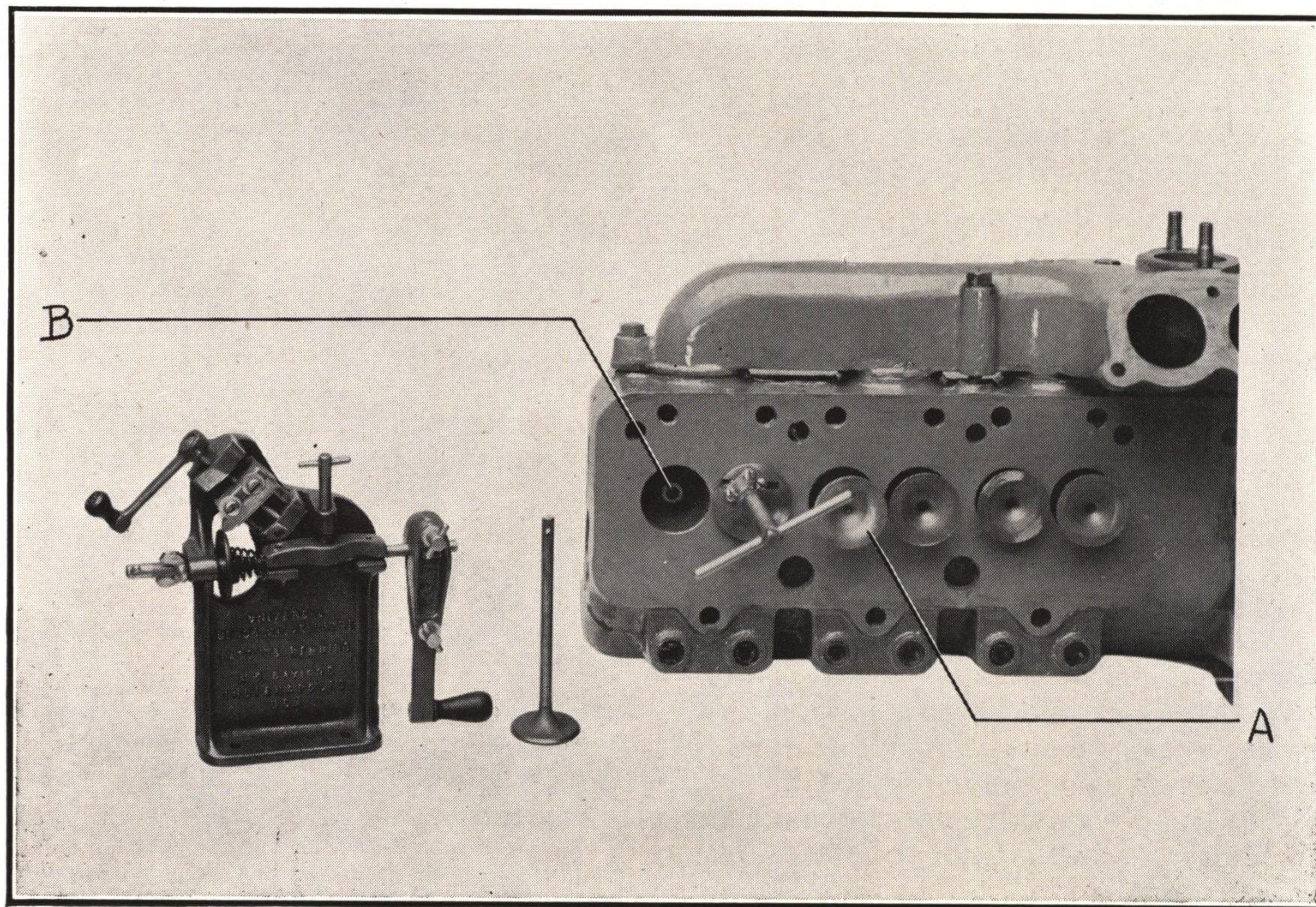
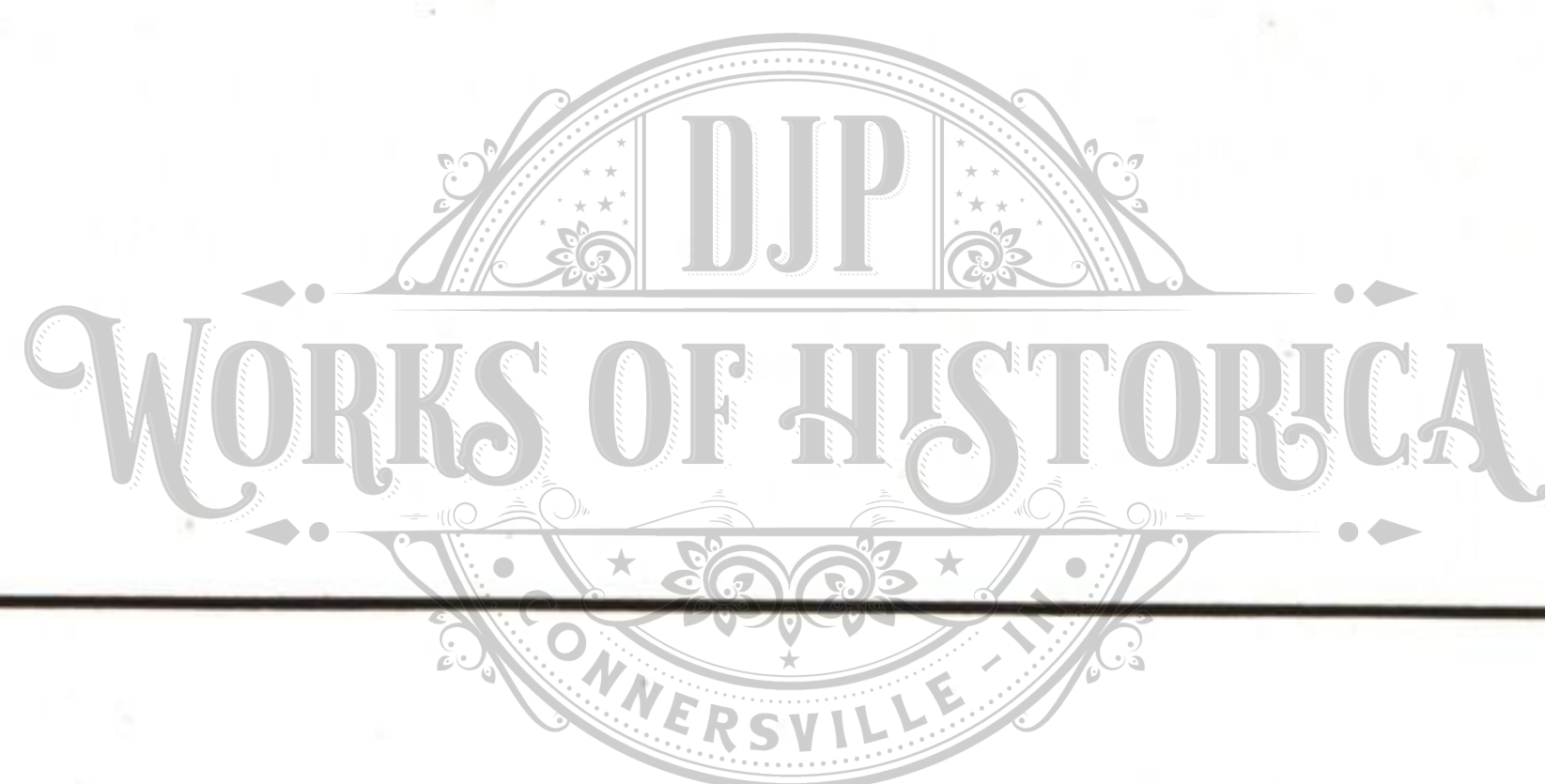


PLATE 11—Grinding Valves

A—Tulip-shaped valves, (E-423), are used. This construction eliminates the conventional slot in the valve head into which the usual tool, by means of which they are ground, is inserted. To grind these valves it is necessary to hold the stem in a small hand tap chuck or run a small flat rod through the valve stem key hole. Then grind the valve by drawing it against its seat. The easiest way to seat valves, after a long period of use, is to true up the valve seat with a reamer and the valve head with a valve lathe. The units illustrated, made by A. C. Savidge, Indianapolis, are comparatively inexpensive—the most efficient we have found—and reduce valve grinding to less than one-half the usual time.



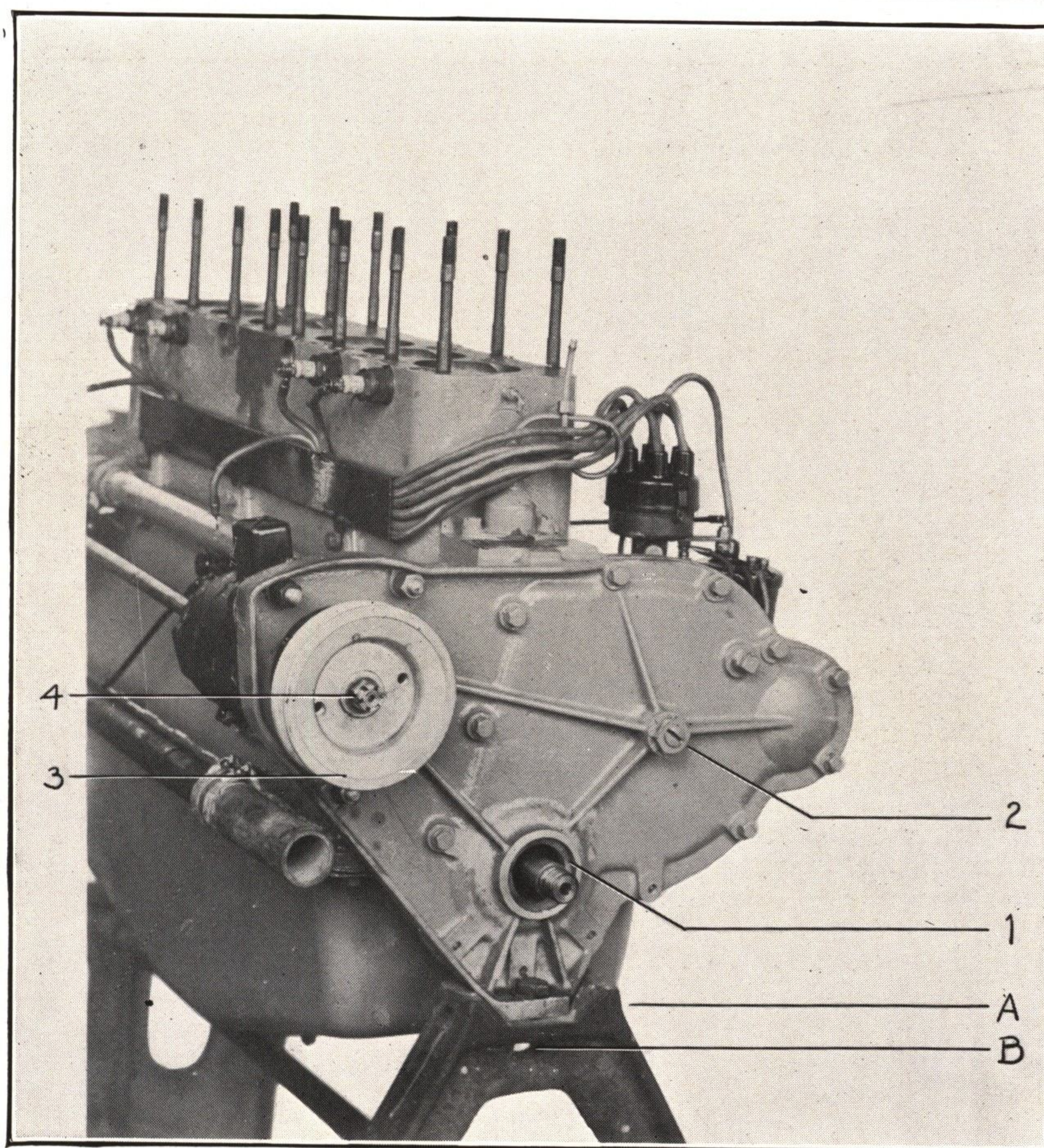


PLATE 12—To Remove Timing Gear Cover Plate.

Note: It is not necessary, when removing the cover plate, to take off the generator drive pulley, as the generator comes off with the plate.

A—If engine is in the car, jack up under the oil pan; but if in a stand block up as shown in Plate E-17, as the front end of the engine rests on the foot of the cover plate, (E-405), and the cover plate cannot be removed until some other support for the engine is provided. If the cylinder head is in place, a rope can be slung under the water outlet boss on the front end of the engine, just as is done when removing the engine from the chassis. (See Plate D-14.) The engine weight is thus supported independent of the cover plate.

B—After the engine weight is off the cover plate, take nut, (E-700), off front hold down bolt, (E-693), which attaches the engine to the front cross member of the frame. The lockwasher for this is (E-694). A special wrench should be obtained for this purpose.

Parts shown on this plate, their names and part numbers.

- | | |
|--|---|
| 1—Cork packing washer retainer ring.. (E-501) | 3—Generator pulley..... (E-412) |
| 2—Note also camshaft end thrust adjusting screw..... (E-505) | 4—Generator pulley castellated nut . (SP-504) |
| Locknut..... (E-506) | Generator pulley washer..... (SP-310) |
| Star lockwasher..... (E-509) | Generator pulley nut cotter..... (SP-2213) |
| | Generator pulley key..... (SP-2104) |

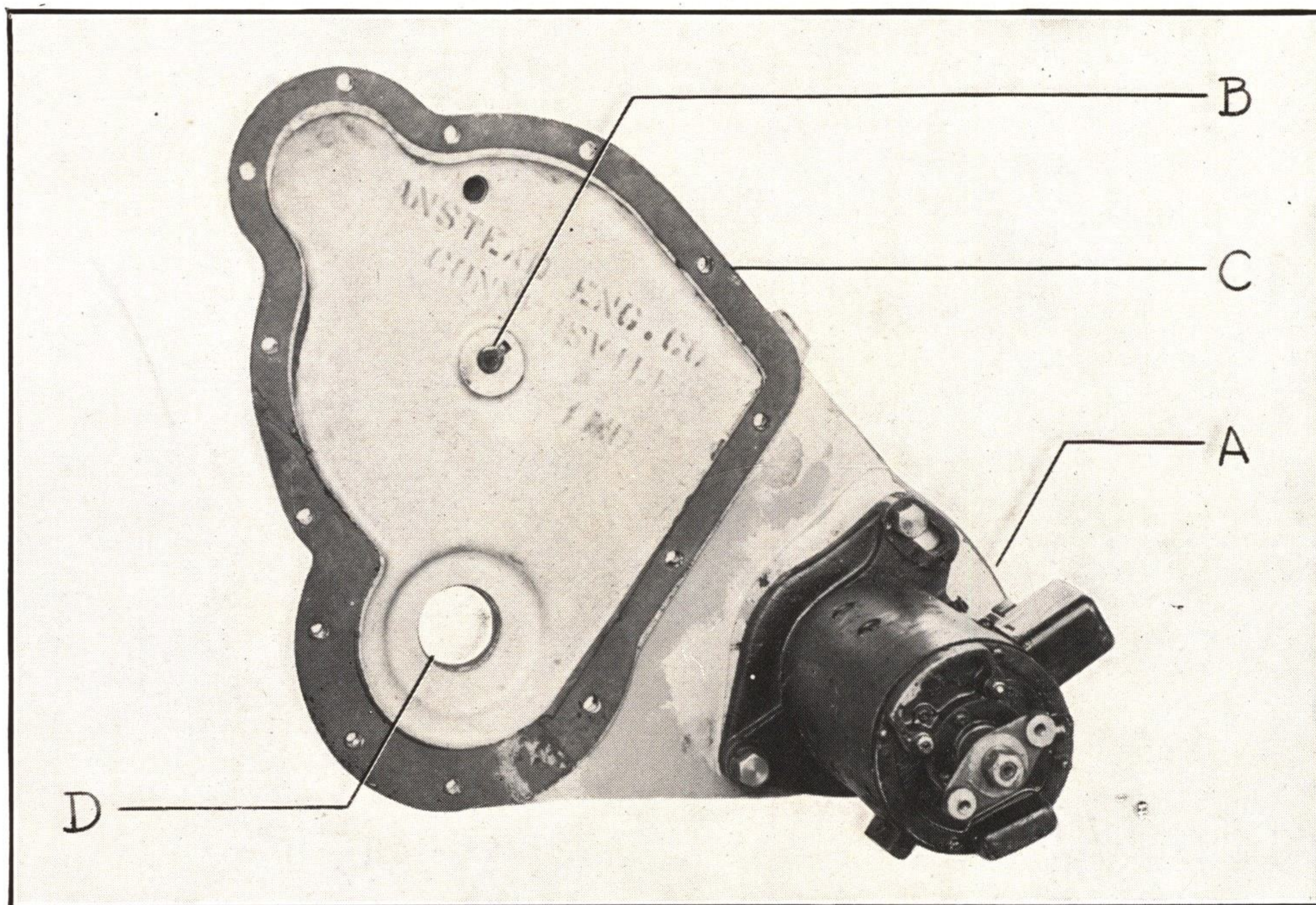


PLATE 13—Rear View of Timing Gear Cover Plate after Removal.

A—Note generator and drive pulley were removed with plate.

B—Take care not to loose camshaft adjusting screw thrust plate, (E-504), from timing gear cover plate.

C—If timing gear cover plate gasket, (E-585), does not stick to the plate, it should be hung up some place to prevent its being accidentally torn.

D—It is not necessary to remove cork packing washers, (E-500), from crankshaft hole in cover plate.

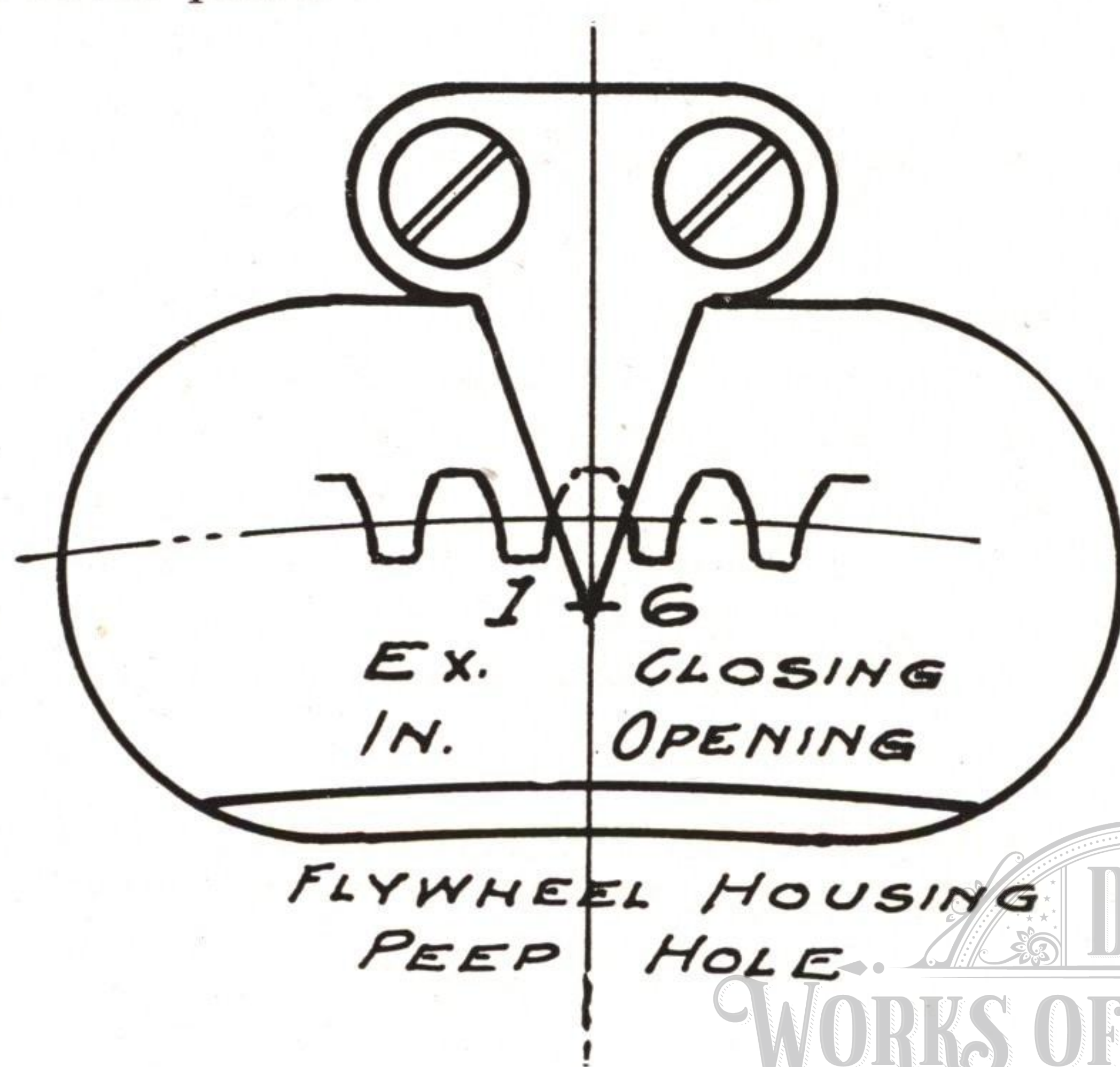


PLATE 14—Position of Flywheel at left, and right corresponding position for Gears when properly engaged.

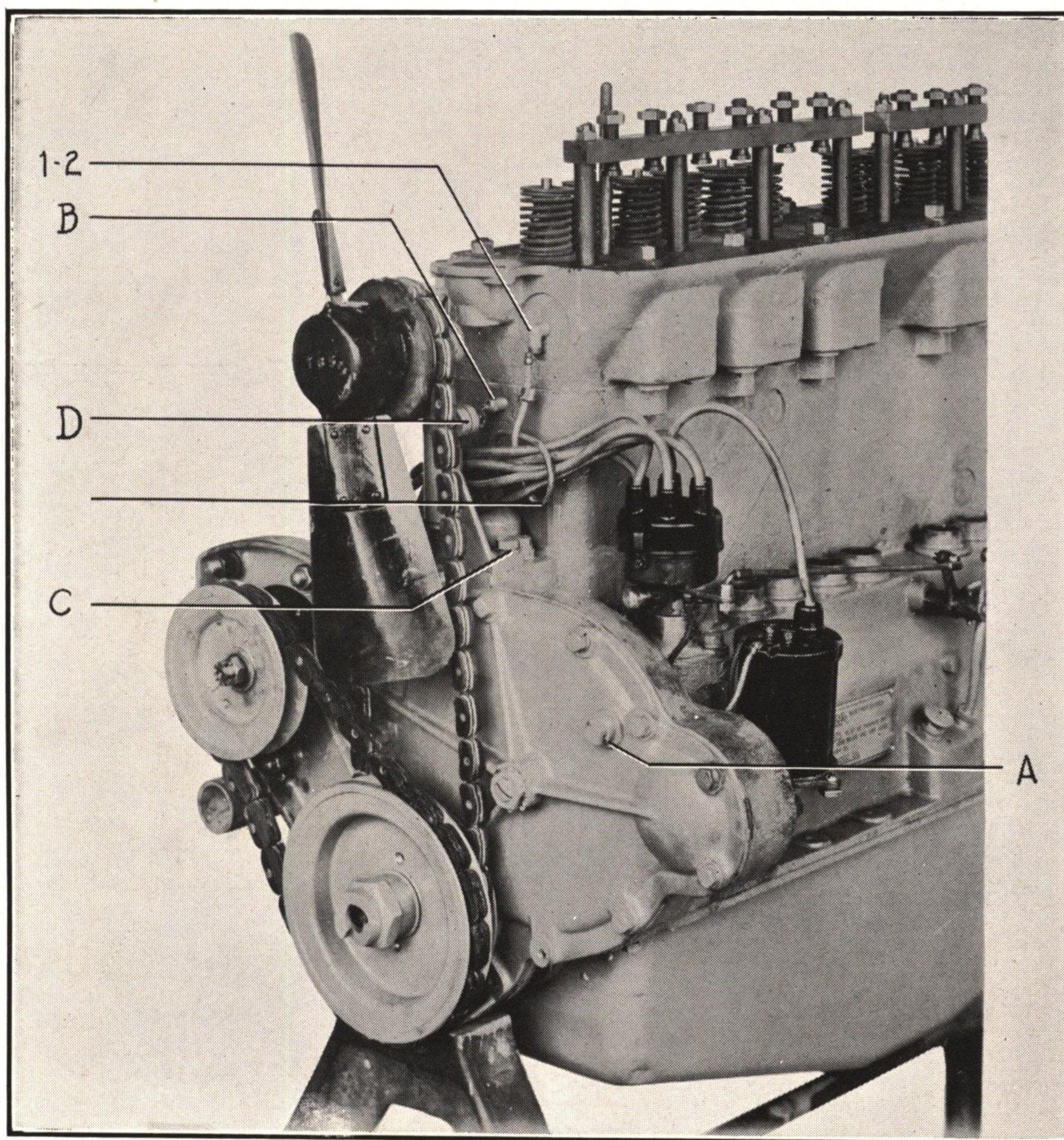


PLATE 15—Method of Timing Ignition

A—Remove timing gear peep hole plug, (SP-3402), indicated and note figures on camshaft gear which indicate the number of the cylinder which is in firing position. This can be observed when the radiator is off, or by means of a small pocket mirror when it is in place.

B—Note small compression test cup, (E-645), which indicates when cylinder number one is about to fire. To observe this, open the pet-cock by screwing out the small handle and listen for the escape of air caused by the rising of the piston on the compression stroke forcing the air contained in the cylinder out through this opening while the engine is turned over slowly with the hand crank. Be sure that the ignition is off. When the air stops escaping, the piston has reached top dead center, and the circuit breaker points should be just starting to open at this time, with the ignition fully retarded.

C—If you are going to remove timing gear cover plate, it is necessary to remove fan bracket. To do this take out cap screws, (SP-932), with lockwashers, (SP-103).

D—Note fan bracket clamp bolt, (SP-932).

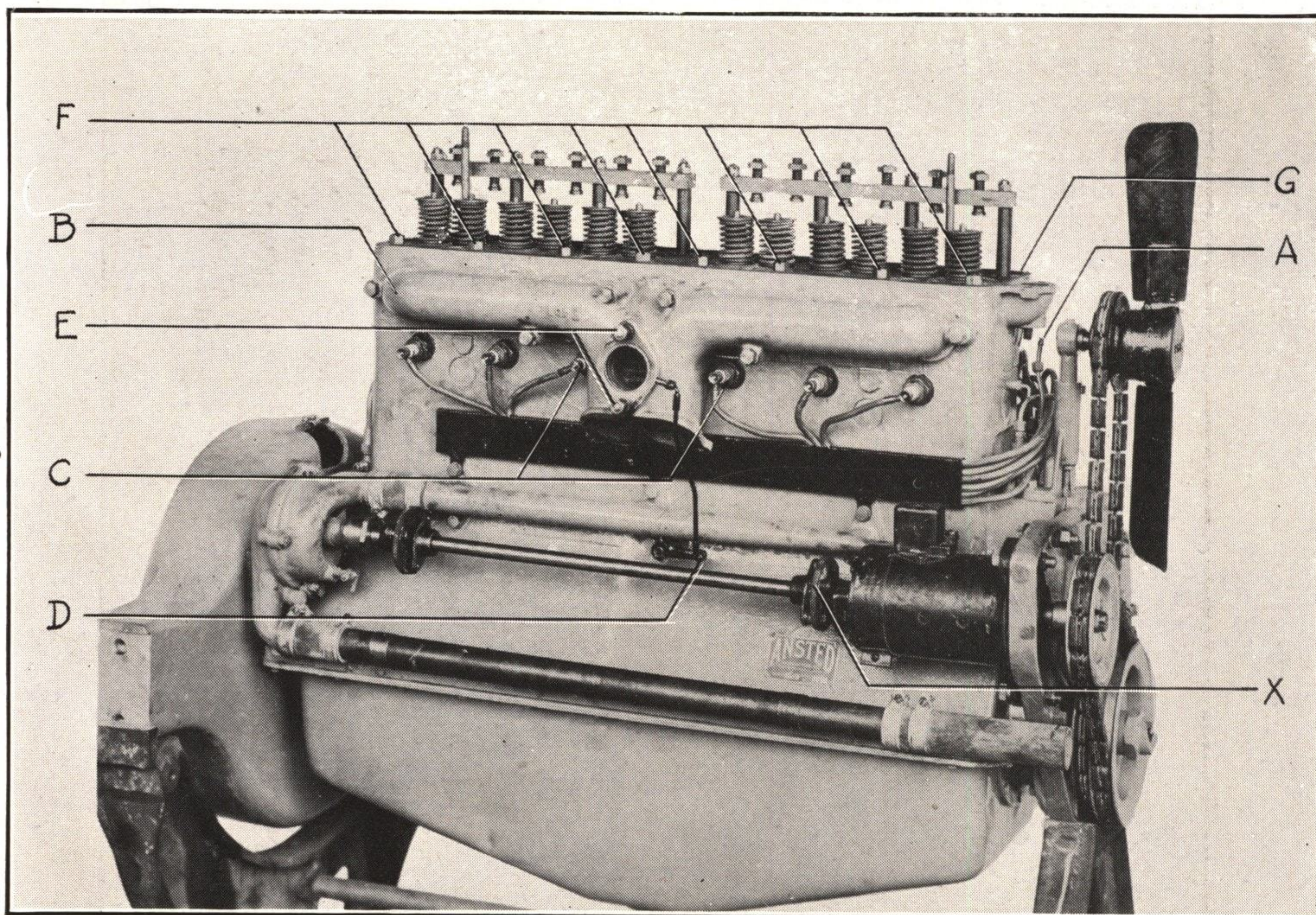


PLATE 16—Preparing to Remove Cylinder Head

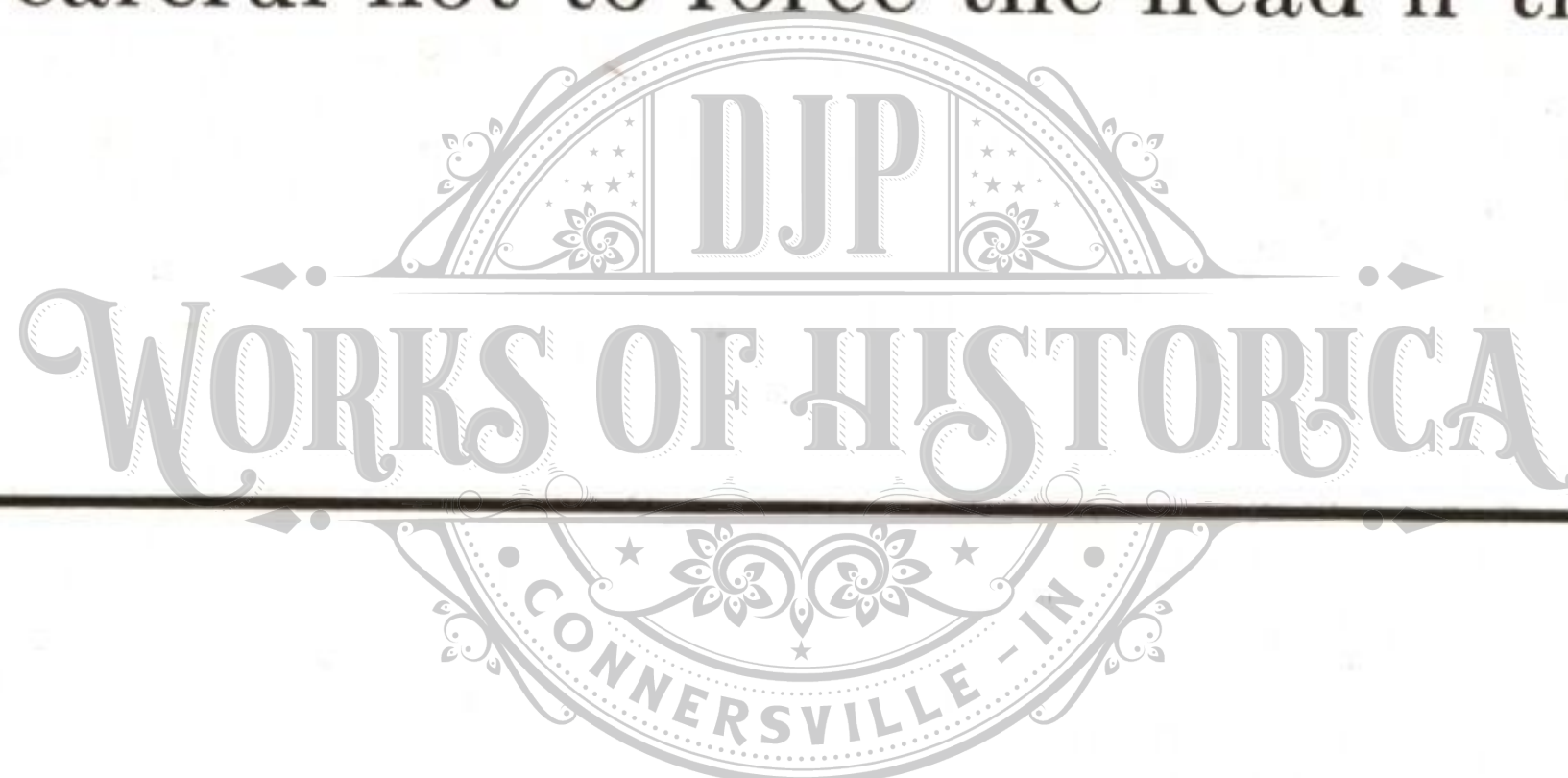
B—Note it is not necessary to take off exhaust manifold to remove head, although it is done for convenience when removing the complete engine, as the manifolds and exhaust pipes can be removed as a unit after the radiator has been taken off.

F—Take off the fourteen cylinder head hold down stud nuts, (SP-403), from the studs, (E-497). In replacing cylinder head be sure to tighten these nuts in the following order:

Front	14 — 9 — 5 — 1 — 2 — 8 — 12 — 13	Rear
	11 — 7 — 4 3 — 6 — 10	

Note: Use special wrench for cylinder head stud nuts.

G—Remove cylinder head by straddling the engine, grasping the rocker arm supports, and lifting *straight* up, being careful not to force the head if there is any binding.



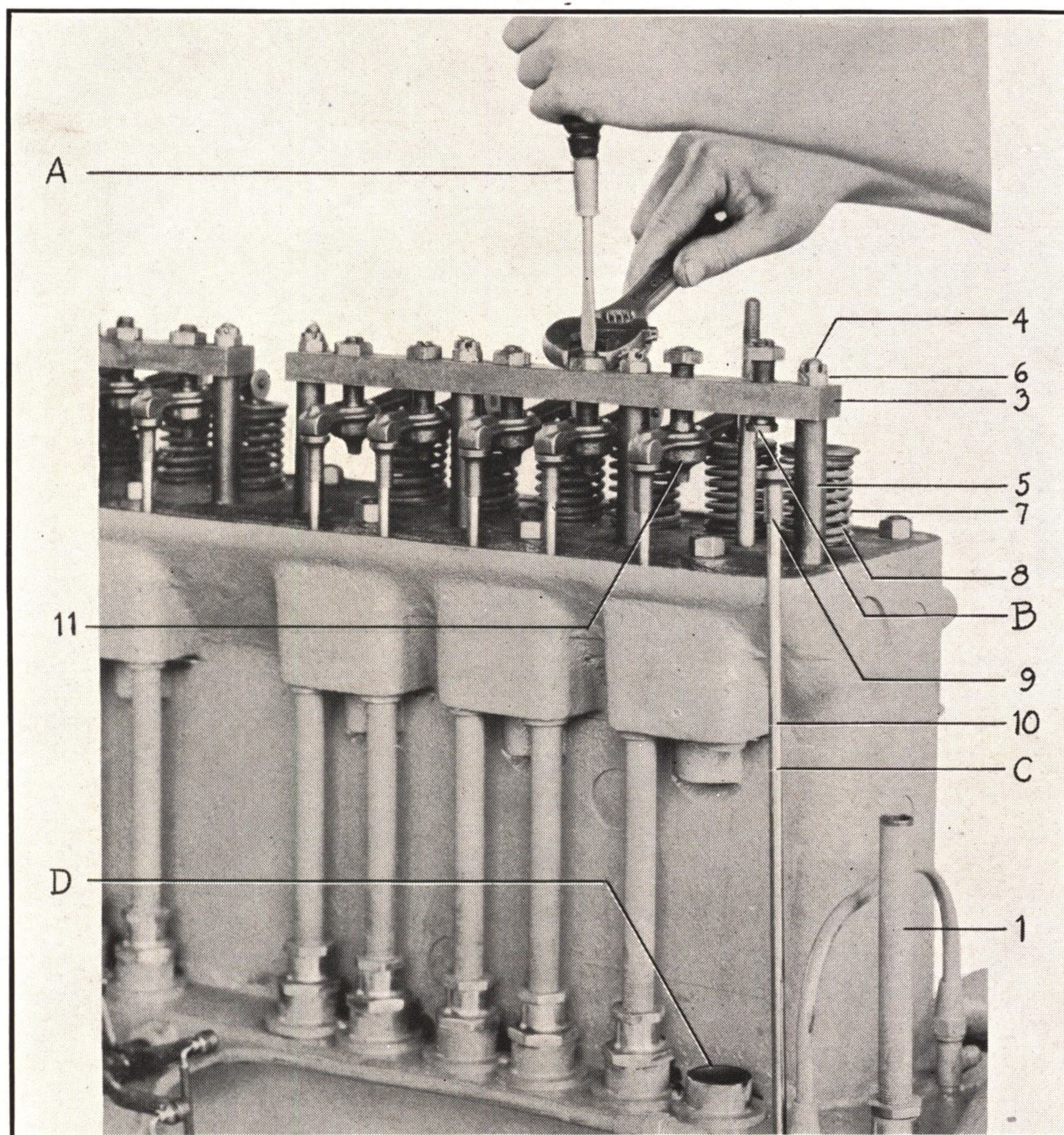


PLATE 17—Adjusting Rocker Arms and Removing Valve Tappets

Note: Rocker arms should be adjusted when engine is hot and tightened so that the push rods can just be turned with the thumb and first finger, and so that there will be no unnecessary play in the mechanism. This can be determined by the sound.

A—Use screw driver and wrench as shown when removing or adjusting rocker arms.

B—It is not necessary to take out entirely to remove rocker arm as shown, but just loosen valve rocker arm adjusting screw locknut, (E-491), and unscrew adjusting screw, (E-450), part way, as shown.

C—Pull out push rod, (E-498).

D—To take off valve push rod tubes, (E-499), proceed as follows: Loosen up push rod tube locknut, (E-444), and turn push rod tube nut, (E-443), in a counter-clockwise direction as is shown by the arrow, or turn the tube in a clockwise direction, as is also shown in the photograph. In this way the locknut is screwed up on the tube, shortening its length and allowing it to be removed from the guide. Special wrenches are needed for this operation.

CARBURETOR SYSTEM

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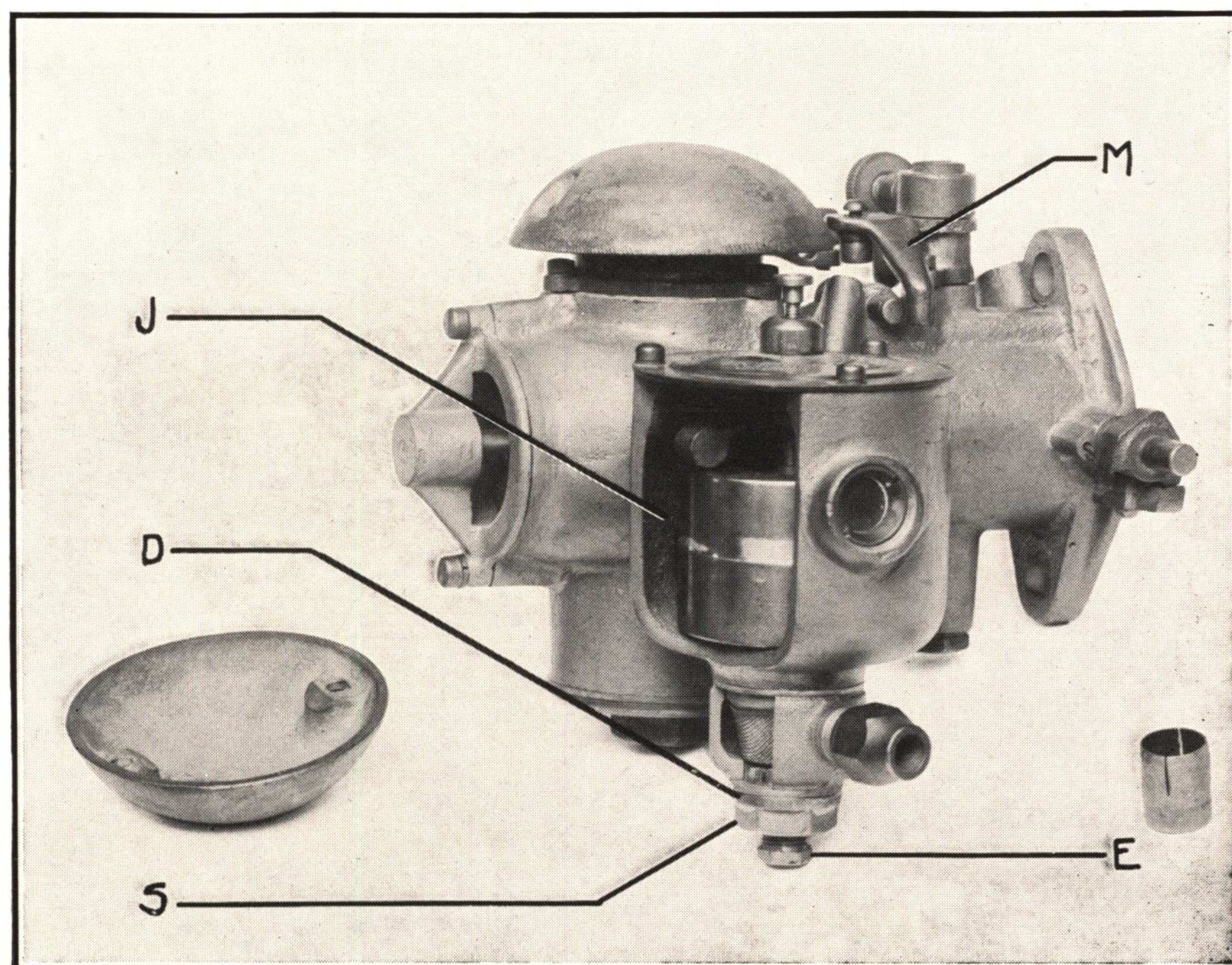


PLATE 18—Carburetor Adjustments

CAUTION: Before adjusting the carburetor, be sure there are no obstructions in the gasoline line; that connections are absolutely tight and free from air leaks; that valves and ignition are properly timed, and that there is a hot spark and good compression in all cylinders.

This model Rayfield carburetor has two adjustments, one for low speed and one for intermediate and high speed. These adjustments cannot change after being set, as they are positively locked. The low speed adjustment A should be turned to the right or left as required until motor runs properly at low speed. Allow motor to become thoroughly heated, then make final adjustment by turning low speed screw to the left until motor slows down; then turn to the right, a notch at a time, until the motor idles smoothly. The high and intermediate speed adjustment B is made by removing the top hood cover C from over the main air valve. Do not move the high speed screw more than one-eighth turn at one time. Turn it to the right for a richer mixture and to the left for a leaner mixture. This setting, being very effective, will greatly determine the fuel economy; therefore make sure that it is set as lean as possible, still retaining good acceleration.

Note: To start motor when cold:

First: Close the throttle and pull dash control all the way up. This is *important*.

Second: When motor starts, open throttle slightly and push dash control one-quarter of the way down.

Third: As motor warms up, push control down gradually as required. When thoroughly warm, push control all the way down.

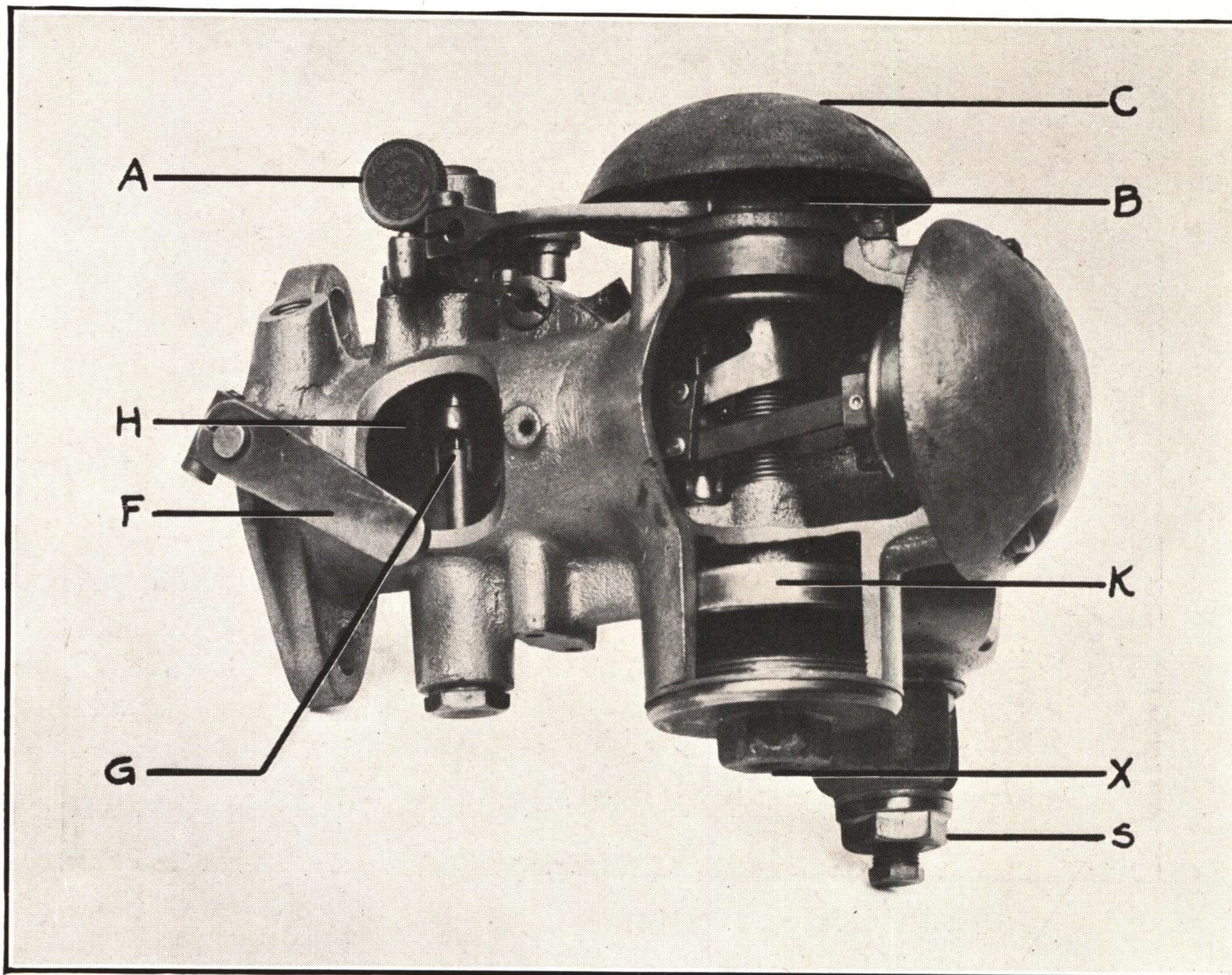


PLATE 19—Cut-out Section of Carburetor

When motor is warm, it is necessary to pull dash control only part way up for starting. This dash control, when properly used, will render easy starting, furnish a richer mixture when motor is cold, and maintain a correct mixture under the most extreme atmospheric changes.

When carburetor adjustments are once made, they should not be changed, as the dash control will take care of cold weather as well as cold motor conditions. Raising the dash control lifts the spray needle G and supplies a richer mixture. When it is raised full distance, a direct passage is opened permitting raw gasoline to be drawn from fuel chamber H of the carburetor to motor. Control button, or lever, should be down for running except when a richer mixture is desired.

The use of a radiator cover or other means of keeping the motor temperature up in cold weather is essential. Good results cannot be expected with a cold motor, with the present grade of fuel.

The float chamber J and dash pot K should be drained occasionally at X (through drain cock not shown), and plug in nut S to remove water and sediment which may have accumulated. The carburetor is provided with a strainer trap L at bottom of float chamber as shown in the cut-away photo. To clean trap, shut off gasoline supply and remove nut S. The gauze may then be easily removed and cleaned. In replacing trap, be sure that both gaskets D are in place and nut is drawn up firmly to insure tight joints. If the trap is only to be drained, this may be done by shutting off the gasoline supply and removing small plug E in nut S.

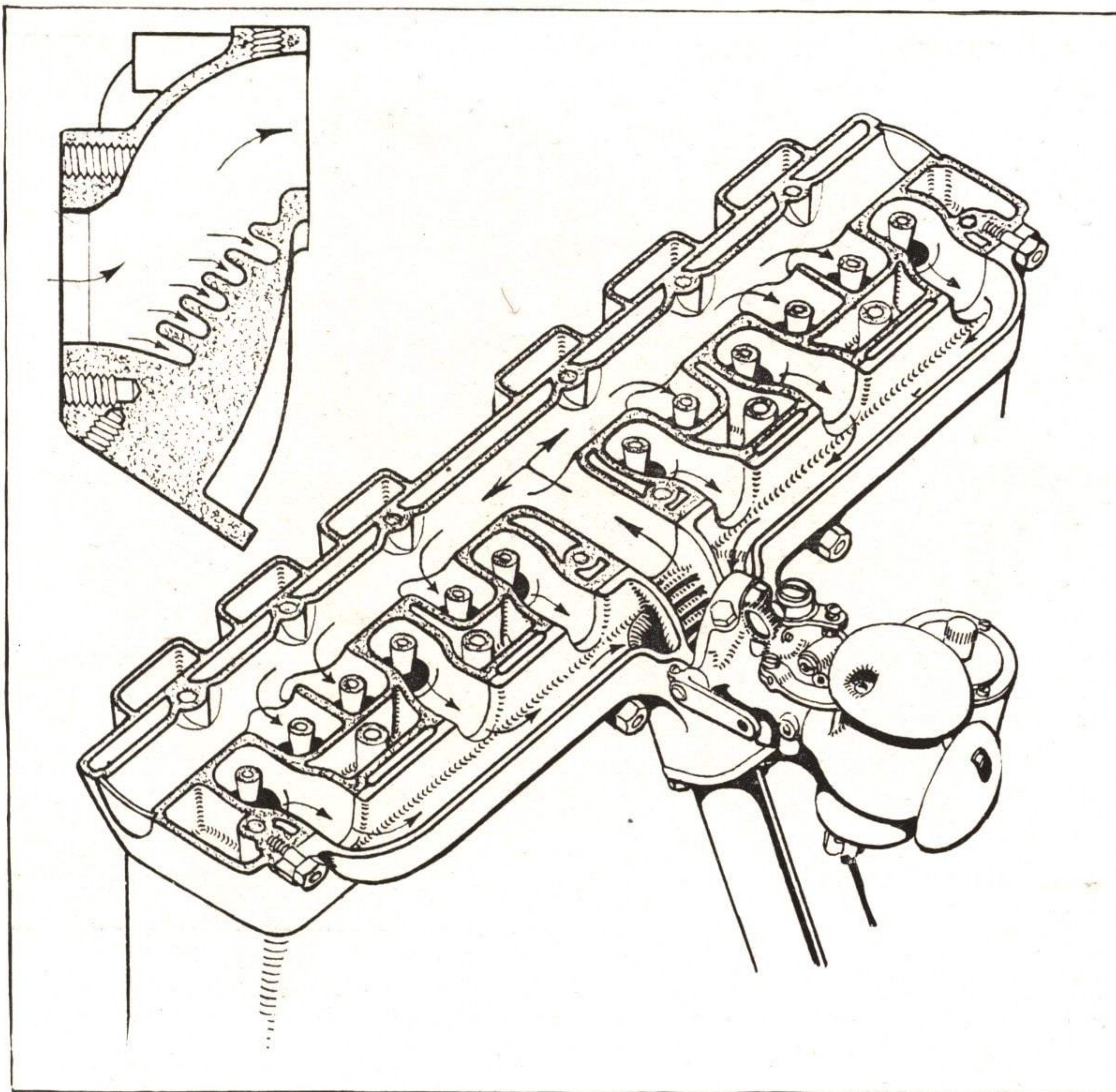


PLATE 20—Section of Lexi-gasifier and Cylinder Head

Incorporated in the Moore Multiple Exhaust System manifold is a device that converts all the heavy portions of the fuel not vaporized by the carburetor into gas, which is taken up by the air stream and carried into engine cylinders to do useful work instead of going down cylinder walls, destroying lubrication. All of the highly volatile portion of the fuel, in passing through carburetor, is vaporized and is carried by the air stream directly into the engine cylinders. The heavy portion, or "high end point," after passing the throttle valve, is deflected into the hot grid at back of manifold, by the bend in the pipe immediately above the carburetor.

The system is so designed that all six of the exhausts play on the back of the grid keeping it quite hot. All heavy particles of fuel falling into this grid are instantly converted into gas, which rises and is carried by the air stream directly into the engine cylinders.

Its action is similar to pouring gasoline on a hot stove.

Don't adjust carburetor to feed rich mixture, as you will only waste fuel and get no results; engine will only burn so much, the rest is wasted.

This device is not to be classed with the so-called hot-spot manifolds, which devices heat the carburetor mixture, both air and fuel. Heating the air expands it, and prevents the cylinders from taking in the maximum amount of oxygen units to mix with the fuel, thereby weakening explosions.

In the Lexi-gasifier the air passes in almost cold taking with it the gasified fuel, providing the maximum oxygen units in a given space for this fuel. This excess of oxygen and gasified fuel produces a greater pressure in the cylinders, hence more power.

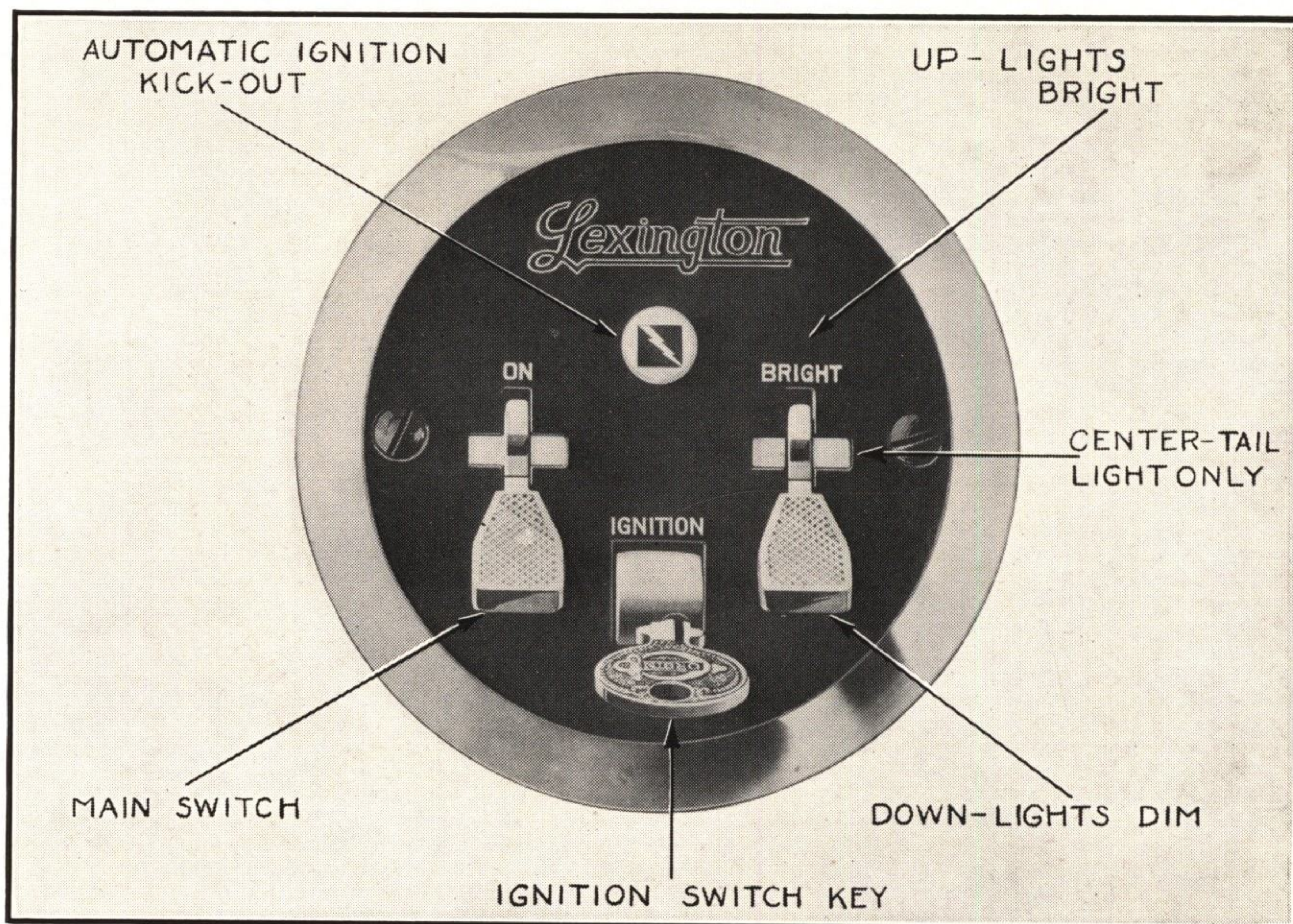


PLATE 21—Automatic Lighting and Ignition Switch

The automatic switch of the Connecticut Automatic Igniter system is a feature that is individual to this system and unique in ignition apparatus. Its function is to kick off the switch should the primary circuit be closed an unwarranted length of time as in the case of the car being left with the switch on and the engine stopped. This will prevent the draining of batteries.

Another purpose is to protect the ignition wiring should a disarrangement occur in the lighting or starting circuit and an excessive and destructive amount of current introduced into the ignition circuit.

The construction is such that no amount of outside vibration or jar can in anyway affect the switch.

This automatic "kick-off" is accomplished thermostatically and is a mechanism that has been employed successfully for many years in Connecticut telephone switches.

Unlike the ordinary overload electrical cut-out, which operates instantaneously, this device is so arranged that it will not kick-off until the circuit has been closed for a short period of time, which allows sufficient opportunity for cranking after the switch button has been pressed. The releasing vibrator is no more complicated than an ordinary electric bell and will operate indefinitely without any attention whatever.

Ignition wires leading to spark plugs should be kept in good condition. Do not allow same to become dirty or oil soaked.

Keep all terminals tight.

Spark plugs should be examined at any time engine does not fire regularly. If coated over with carbon or soot, take apart, by unscrewing the packing nut, and wipe off porcelains. Replace and screw up tight to prevent leaks.

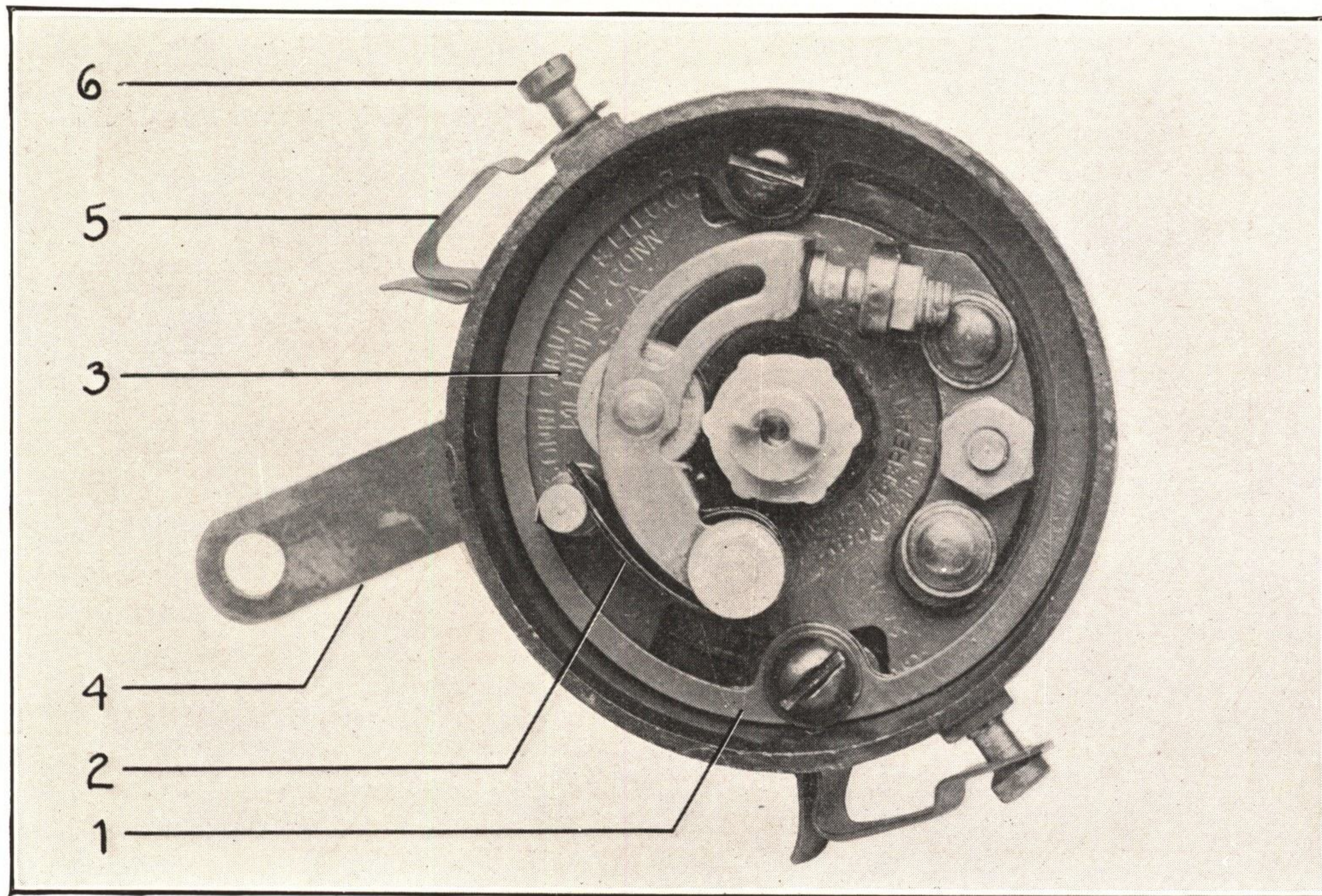


PLATE 22—Detail of Distributor Breaker Mechanism

The breakers are carefully adjusted and lined up at the factory and should need no adjustment on the breaker points.

The vaseline cup as shown on the side of the igniter should be unscrewed and filled with ordinary vaseline about every two or three thousand miles. *Do not*, under any circumstances, *put grease* into this cup—nothing but vaseline can be used.

The points on the igniter should have .012" to .015" opening. This adjustment is made by turning the small set screw with a screw driver, either to the right or left.

As the contact points on this system are the only parts which will need renewal, we have devised a plan of replacement which is so simple that any one can make it by following the instructions on Page 56.

It is of course a well-known fact that the points in any magneto or igniter must be occasionally renewed as they will wear out in time. In the case of the magneto, it is usually necessary to remove it from the car and send it to the maker or some magneto repair shop for the necessary renewals. This not only holds up the car but as a rule it means many dollars expense. With the Connecticut Igniter system, however, the renewal of contact points can be easily and quickly made at a very slight expense by installing a new breaker plate, (See Plate 16).

Parts shown on this plate, their names and part numbers:

- | | |
|--|---|
| 1—Distributor breaker plate retainer.. (I-458) | 4—Distributor advance lever..... (I-465) |
| 2—Distributor breaker plate retainer spring..... (I-459) | 5—Distributor head hinge..... (I-466) |
| 3—Distributor breaker plate..... (I-460) | 6—Distributor head hinge screw..... (I-467) |

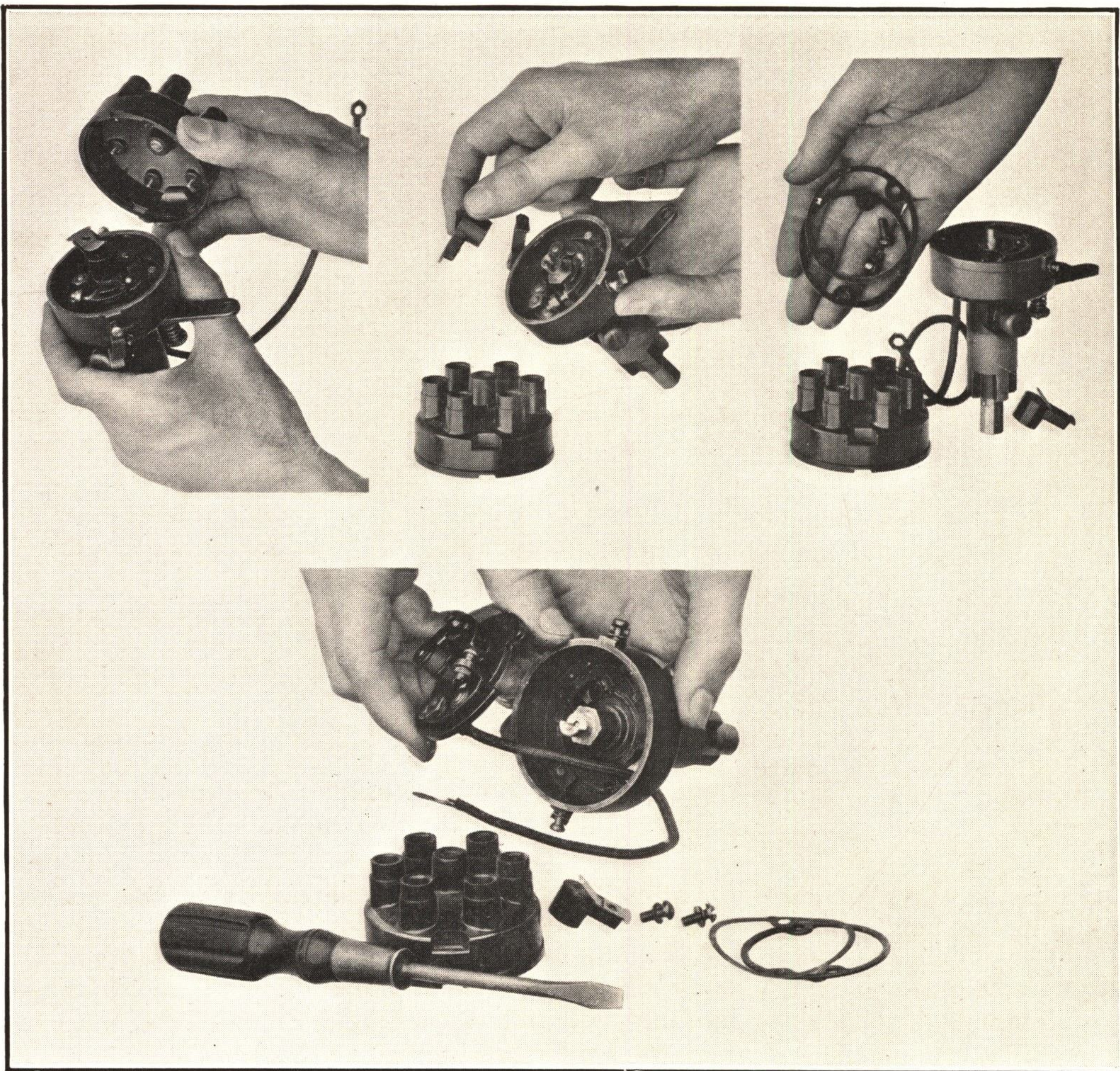


PLATE 23—Method of Renewing Contact in Igniter.

Remove the cover from the coil and disconnect the wire connected to Post "B," which is the wire that runs direct to the breaker plate, and proceed as shown in the above illustration.

In order that the replacement of contact points may be accomplished in the simplest and quickest manner possible, the Connecticut Igniter has been designed so that the mechanism, of which these points form a part, is mounted on a removable plate and it is necessary only to remove the distributor head without disconnecting the secondary wires, slip off the distributor arm, disconnect one wire from the coil, remove the two screws which hold the breaker plate in position, and the whole breaker mechanism can be removed from the housing. A new breaker plate can be substituted for it, by reversing the above operation, without in any way affecting the timing of the ignition.

BEARING ADJUSTMENTS

The constant pressure oil system on the Ansted Motor permits of larger clearances in the bearings than in ordinary motors. The adjustment of the bearings of the Ansted Motor is a very simple matter, if the following instructions are closely adhered to:

Remove the pan from the bottom of the motor and then take off bearing caps and examine bearings to see that all contact surfaces are in good condition, and that there is no need of replacement. All bearings should have a clearance of from one and one-half to three one-thousandths ($1\frac{1}{2}$ to $3/1000$). This clearance can be accurately measured with a folded cigarette paper. Secure a package of Riz La Croix cigarette papers, tear in two pieces the short way and fold evenly. Take one of these pieces and insert in the bearing and put on cap, tighten up bolts and if there is sufficient tension on the bearing to support the end of the connecting rod in a position horizontal with the shaft and if it is possible to pull this rod down with one finger without too much resistance, the adjustment is correct. Now remove cap and take out paper, replace cap and tighten up nuts.

The same procedure may be followed in case of the main bearings—the only difference noted being this: That with the main bearings, you will need to take hold of the shaft to see if it slightly resists your efforts to turn it. After all adjustments have been made, be sure that all nuts are tight and locked in place and bolt up pan.

NOTE

In replacing pan, to prevent destroying the gasket on the front end of the timing gear cover, it is well to have a piece of tin about six inches wide and twelve inches (6" and 12") long to be slipped in between the gear case cover and the oil pan, so that the pan will go in place without destroying the gasket. After the pan is in place, the tin may be pull out and then the pan bolted up in position.

